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JOURNAL OF EDUCATIONAL RESEARCH

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JOURNAL *of* EDUCATIONAL RESEARCH

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SPECIAL EDUCATION AS A DEPARTMENT OF SCHOOL ADMINISTRATION[1]

EDGAR A. DOLL

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PUBLIC education has two major purposes: preparation for life, and preparation for a livelihood. The first purpose is achieved by providing the cultural background of civilization and those social attitudes which make for good citizenship. The second purpose is achieved by developing such knowledge, skills, and attitudes as are essential to economic independence.

Our democracy is based on a conception of political and social equality. This ideal cannot become a reality without universal equality of educational opportunity. Our system of public education is designed to guarantee freedom of opportunity and equality of opportunity to all our children. But such complete freedom and true equality are not provided in any school system unless, or until, the method and content of instruction are developed in terms of the individual learning aptitudes of the pupils. Equality of educational opportunity cannot, therefore, be measured in dollars, buildings or curricula alone. The measure of real equality is the extent to which the instruction is determined by the native gifts or handicaps of the individual school children. It is as true in education as in dieteties that "one man's food may be another's poison."

Compulsory education now brings to school and holds there to a relatively late age a class of children who formerly did not attend school in large numbers. The educational possibilities of these children in terms of native capabilities have not yet been adequately provided for in many places. Compulsory education may have serious and vicious consequences unless the things taught can actually be learned. We need more education, but it must be the right kind. It is folly to oblige children to attend school if the result forces upon them a depressing consciousness of their weaknesses.

[1] Read before the Division of Special Education, Department of Classroom Teachers, of the National Education Association, Columbus, July 1, 1930.

Educational tradition, originally founded on a scholastic system for the development of an intellectual aristocracy, has, over many years, developed a curriculum which is ill adapted to the capabilities of many school children of to-day. In attempting to provide freedom of opportunity by assuming that each child who enters the kindergarten should go through a course of study which prepares for college, we have seriously handicapped that large majority of school children who are not even entering high school. Public education in this country is conservatively progressive and properly opposes radical movements, but modern educational research has clearly demonstrated such marked individual differences in capacity to receive instruction that in justice to the children, as well as to the nation whose future citizens they compose, public education must be rendered more efficient by a closer correlation of teaching idealism with learning realism.

Our public school system is organized on a basis of group instruction in fairly large classrooms. The successful administration of such instruction makes it advisable that the children in these classrooms shall be of the same general level of ability and community of interests. Otherwise the success of group instruction is jeopardized by the need for supplementary individual instruction in order that all children may proceed at the same pace. Without recognition of individual differences in capacity for receiving instruction, children of superior talent are held back while children of inferior talent are driven forward, to the detriment of both groups. Likewise, the great mass of children of average ability suffer from the special attention given to the exceptional types, since this attention is provided at the expense of the normal group as a whole.

The school population brought together by compulsory public education includes large numbers of exceptional children who differ so markedly from the rest of the group in their physical, mental, and social development that they require special attention if their education is to be successful. These exceptional children confront the public school with a number of important educational problems. The instruction of these children in the regular classrooms places an extra burden on the teaching staff and handicaps the efficient instruction of the average group without, however, suitably providing for the needs of the exceptional children themselves. This situation materially reduces the efficiency of instruction and is reflected in the problems of over-ageness, school failure, early elimination from school, maladjustment, and juvenile delinquency.

Special education is an administrative device for meeting the needs of exceptional children more effectively than is possible under ordinary conditions in the regular classroom. The underlying principle of special education involves the classification of children according to their individual aptitudes and disabilities. This makes possible more rapid educational advancement for both the regular and the special groups, thereby materially increasing the efficiency of instruction without greatly adding to the cost.

Exceptional children are those who deviate either physically or mentally from the normal to such an extent that they cannot, in justice to themselves or to others, be educated satisfactorily in the regular grades by means of the traditional subject matter and methods of instruction. They require special or differential education to make the most of their possibilities.

The social significance of special education is much greater than the small number of children who require it would indicate. It deals with both extremes of human variation; namely, the gifted,—society's greatest asset, and the physically and mentally handicapped,—society's greatest liability. One extreme furnishes many times its share of great leaders; the other, many times its share of dependents and delinquents. A slight increase in the ability of these exceptional individuals at the extremes has much more social significance than an equal increase in the same number of average individuals. With the gifted, it may make the difference between success and failure in the solution of some of society's most difficult problems; with the physically and mentally handicapped it may make the difference between self-supporting, law-abiding citizens and dependent, delinquent members of society.

Education has become corrective as well as preparatory. It has become specialized with reference to the number and variety of defects and deficiencies inevitably present when all the children of all the people must attend school. The mentally retarded, the physically handicapped, and the socially underprivileged must receive their due if public education is to be administered with republican equality and justice.

Special education began with the early attempts to teach the deaf and the blind. This movement was extended during the last century so as to include the mentally deficient, who rapidly dominated other types of specialized instruction. The specialized teaching of the mentally deficient in public institutions and in isolated special classes received a tremendous impetus with the advent of the Binet-Simon tests. These

tests increased the practicability of detecting and segregating the mentally subnormal, and served to indicate the direction as well as the extent of their limited capabilities. Education in simple industrial arts and handicrafts soon replaced the academic course of study which was, for them, impossible. Improved systems of classification, better methods of teaching, wiser selection of subject matter, and more practical objectives of instruction became the accepted practice of most special classes. This movement so dominated specialized instruction that the special class to-day is still synonymous in many places with differential education for the feeble-minded.

The progress growing out of these experiences has revealed that the backward child educationally resembles the feeble-minded child at only a slightly higher level. His inherent difficulty with the academic curriculum is reflected in the fact that fewer than half of the children who enter the public school graduate from the eighth grade. Only about one third go on to high school, and about one in ten to college. Yet the academic curriculum, being essentially a stepladder type of training, assumes that every child who enters the first grade shall be prepared for college entrance. The large percentage of school children who fail without even reaching the sixth grade has been greatly handicapped in the persistent attempt to force an academic education upon all those who enter the public school.

The modern vocational and trade schools and the junior high schools afford some escape from this difficulty, but the academic prerequisites for admission to these schools greatly limit their usefulness for the child of low verbal intelligence.

In placing a premium upon a cultural type of school program, we tend to make third-rate clerks of what otherwise might be first-rate artisans, and second-rate mechanics of what might otherwise be first-rate semi-skilled workers. This system also ignores the tremendous social significance of education as preparation for independent social adjustment in a republic which requires every citizen to participate in the function of government. It fails to capitalize the social idealism and the economic self-respect with which every normal child is happily endowed.

Special education is an administrative method of overcoming these embarrassments of mass education. Its recent aspects are much more constructive and more wide-spread in their application than were those of the early movement. Special education today means that entire field of education which deals with all forms of handicapped children, whether

the handicap be mental, physical, social, or educational. Instead of merely bolstering the defects of a single group, such as the feeble-minded, it is reaching out to meet the needs of all kinds of atypical children.

Even a cursory review of the existing situation in the public schools shows a very gratifying development of special education in comparatively recent years. The school laws of many states make mandatory provision for the mentally deficient, and many municipalities have well-organized instruction for such children. The movement has made important progress even in many rural counties. Although these classes may not adequately meet all the needs of the pupils, there is at least a recognition of those needs and a conscious attempt to provide adequately for them.

The development of special education for other types of handicapped children, which accompanied the movement for medical inspection in the public schools, has not made progress commensurate with the need. While most of the larger school systems have made some provision for the blind, the deaf, the constitutionally handicapped, the crippled, and the delinquent, few cities have developed the degree of systematic administration of such special classes which is necessary for the successful instruction of these children. Indeed, the professional literature is quite obscure and uncorrelated from the standpoint of sound technical administration of special education as a separate department of public instruction.[2]

The successful administration of specialized instruction obviously requires, first of all, suitable diagnostic facilities for the selection, classification, and differential treatment of such children. Many systems avoid the issue because of the apparent expense. Other systems have not been sufficiently progressive to provide the technical personnel necessary to the adequate conduct of this instruction. Still other systems are so imbued with the time-honored concepts of traditional education that they refuse to adapt their practice to the obvious needs.

A comprehensive survey of special education was recently undertaken in a representative eastern city with a population of about twenty thousand school children, for the purpose of establishing a modern sys-

[2] Cf., however, White House Conference on Child Health and Protection, Committee on Special Classes, Charles S. Berry, Chairman. *Special Education: The Handicapped and the Gifted.* (New York: The Century Company, 1931), 604 pp.

tem of instruction for exceptional children.[3] This study resulted in a proposed administrative organization for special education in terms of sixteen types of special classes.

Seven of these types represented classes for the physically handicapped; namely, the blind, the partially sighted, the deaf, the hard-of-hearing, those with lowered vitality, those with active tuberculosis, and the crippled. Three of the sixteen types were for the mentally retarded; namely, the low-grade feeble-minded, the high-grade feeble-minded, and the borderline subnormals. One type of special education was proposed for those with various kinds of educational disabilities, another type was proposed for the intellectually gifted, and still another was recommended for truant and delinquent children and for those requiring disciplinary action. Special classes were also proposed for children with combined mental and social handicaps; *i. e.*, those requiring continuation schooling. Another type of class was recommended for children with defective speech, and still another for children who were psychiatric problems, requiring assistance in individual, mental, and social adjustment.

These sixteen types of classes required at least as many types of specialized instruction, with due regard for administrative as well as pedagogical considerations. It was found that in order to adequately select and classify exceptional children, an educational guidance clinic would be necessary with a staff of trained workers, consisting of psychiatrists, psychologists, physicians, and social workers. It was recommended that such a clinic act in coöperation with a department of research and measurement, such as is now considered indispensable in the larger school systems.

The group of specialists conducting this survey reckoned with all types of school problems from the standpoint of the best adjustment of the individual children in relation to their various handicaps. They called attention to the high percentage of school failures common to these children while in the regular grades, and deplored the personal injustices to the individual children, the economic losses, and the social maladjustments which confront the educational misfit in school and in later life.

This survey showed that the different types of handicapped children constitute at least ten to fifteen percent of the total school population.

[3] Berry, C. S., Derrick, Calvin, McCord, Clinton P., Wilkes, LeRoy A., and Doll, Edgar A. *A Survey and Program for Special Types of Education.* (Trenton: Board of Education, June, 1929), 96 pp. This report has been freely used in the present address.

Their school lives are beset with very definite hazards from the point of view of the best conservation of physical and mental health, of personal happiness and of social or industrial effectiveness.

Special education in the past stressed the incompetence or the disabilities of handicapped children. This point of view is, however, being rapidly replaced by a much more wholesome and constructive attitude on the part of educational specialists and school authorities. We are entering a phase of public instruction where education is viewed as a device for assisting all children to realize their most complete development. While we cannot deny the general correlation of abilities and disabilities, neither can we deny a reasonable prospect of successful education for every child in terms of his total individuality. Few children are so hopelessly afflicted that life holds little promise for them, if only a reasonable effort is made to help them during their formative years. We must endeavor to capitalize such talents as they possess and to avoid emphasizing their handicaps.

Biography and history are filled with notable instances of successful adjustment on the part of persons with serious disabilities. To the number of such eminent persons who have risen above native or acquired disabilities must be added those successful individuals of lesser fame who have weathered the storms which brew about some incapacity or defect. Many such persons have found in their disabilities a positive spur to extraordinary effort. Often the disability has been a real asset in requiring the redirection of energies along successful channels which perhaps would not have been feasible except for the handicap. An entire school of psychiatry has been founded on the theory that organic inferiority creates positive incentives toward developing talents that would otherwise be unrealized. We need not press this point of view so far as to urge that normal persons cultivate constitutional disabilities in order to succeed, but certainly there is a wealth of definite evidence to indicate that such success is at least not impossible.

It has been said that "the proper study of mankind is man." Yet, few fields of knowledge have had less successful prosecution than this. We are to-day, however, on the verge of discovering many of the important secrets of human adjustment and success. We are gradually coming to accept the proposition that most of the maladjustments of adult life have their foundations in comparatively early childhood. While it has long been suspected that the present organization of the public school may, and does in many instances, constitute one of the

most serious menaces to the mental health of children, we have been slow to acknowledge that this all-important period of their lives can be safe-guarded if we will but give sufficient thought to the matter.

It has been said of medicine that we can have all the health for which we are willing to pay. Medicine to-day offers much more in the way of preventive and corrective measures than most individuals or communities utilize. May not the same be said of education? If we cannot have all the education we are willing to buy in the public school system, we can at least have more than we now have if we will but capitalize experimentally established devices for improving public instruction.

AN ANALYTICAL STUDY OF THE DEVELOPMENT OF ILLEGIBILITIES IN HANDWRITING FROM THE LOWER GRADES TO ADULTHOOD

T. Ernest Newland
Bucknell University

Summary.—Analyses by twenty-four different persons of 1,344,905 letters written by 2381 different individuals, ranging in age from first grade children to adults in different occupations, resulted in the tabulation of 42,284 specific illegibilities. A study of these indicated that:

1. There were more forms of illegibilities peculiar to the different age groups than there were common to two or more age levels.

2. The illegibilities of only four letters (a, e, r, t) contributed 45, 46, and 47 percent to the elementary, high-school and adult groups respectively.

3. Only fourteen forms of illegibilities in the elementary and high-school levels and nine in the adult group contributed 50 percent of all the illegibilities recorded.

4. Only four types of difficulties in the formation of letters caused over one-half of all the illegibilities.

5. The gross frequency with which illegibilities appeared tended to increase with age.

These results indicate that while remedial or preventive work should be adapted to the different age levels, either the prevention of illegibilities in the writing of the letters "a," "e," "r," and "t," the correction of from nine to fourteen forms of illegibilities, or the correction or prevention of four types of bad letter-formation habits would decrease the number of illegibilities by one-half. Corrective or preventive work directed along all three of these lines would probably eliminate at least three-fourths of all illegibilities.

Introduction.—The problem of illegibilities is essentially a social one; correspondence of all sorts is illustrative of this, whether it be in terms of confusions on personal checks or in terms of undecipherable parts of social correspondence. In spite of the fact that this problem is of such importance, illegibilities have not attracted sufficient scientific attention. That they are deserving of such consideration should seem apparent to any one who will recall instances in which errors have occurred on account of confusions. While recorded instances such as the one which appeared in the *Church World:* "And they were married and lived hap-

pily even after," and a London dispatch to the *New York Sun* in which this statement was made: "We have not done any business with firms or persons in America since Prohibition came into farce in that country" may be amusing now, there may have been times when humor was not the predominating note.[1]

This study is an attempt to answer the following questions: (1) What letters are most frequently illegible? (2) In what way or ways do these illegibilities occur? That is, are certain letters illegible in one or more ways? Do the different forms appear with approximately the same frequencies? Are any differences apparent in the comparison of results at different age levels? And (3) do the answers to these questions suggest any remedial or preventive measures?

While a sizable number of studies has been made on the general aspect of quality of cursive handwriting, very few have been recorded where the specificity of the illegibility problem has been even mentioned. Ayres,[2] in 1913, and Freeman,[3] in 1915, referred to a few specific letter illegibilities which they considered deserving of attention, but they pushed the matter no further. Nothing other than implied expert opinion was cited in light of which they seem to have made their statements. In 1927, S. L. and L. C. Pressey[4] published the results of the pioneer investigation in the field of specific analysis of illegibility.[5] The study summarized here is similar to that of the Presseys' with the exception that this one had a wider and more adequate sampling of ages, the resulting mass of material analyzed was greater and the data of this study were submitted to a more elaborate analysis.

Materials and Methods.—The material used for this analysis consisted of regular periodic papers collected from a total of 1500 pupils in the eight grades of the elementary school, from 452 students in the four grades of the high-school level, from 297 college students repre-

[1] "Humor in Error," *The Readers Digest*, November, 1931, p. 67.

[2] Ayres, L. P. "A Scale for Measuring the Quality of Handwriting of School Children," Bulletin No. 113, Russell Sage Foundation, Division of Education, 1913.

[3] Freeman, F. N. *The Teaching of Handwriting.* Boston: Houghton Mifflin Company, 1915.

[4] Pressey, S. L., and Pressey, L. C. "Analyses of Three Thousand Illegibilities in the Handwriting of Children and Adults," *Educational Research Bulletin*, VI, September 28, 1927.

[5] Related to this general problem is the study on illegibilities in numerals. See: Newland, T. E. "A Study of the Specific Illegibilities Found in the Writing of Arabic Numerals," *Journal of Educational Research*, XXI, March, 1930.

sented mainly by sophomores, but including also juniors and seniors, and letters written by 132 different adults to editors of two different city newspapers. The schools from which the specimens were collected were in widely separated states and can reasonably be considered to be typical of the general school situation. Both city and country schools supplied material. No one system of handwriting instruction contributed an overwhelming portion. No papers were prepared expressly for this study. A part of them were done with pencil and a part with pen. In all, 341,315 words, or 1,344,905 letters, written by 2381 different persons provided the basis for this analysis. Table I, below, shows the distribution of the material among the different groups.

TABLE I

SCOPE OF THE MATERIAL ANALYZED

Groups	Number of Persons Writing	Number of Words Analyzed	Number of Letters	Number of Specific Illegibilities	Number of Readers
Elementary Grades					
1	60	434	1,573	29	1
2	133	3,449	12,503	242	1
3	174	6,813	24,697	560	1
4	178	17,744	64,322	1,917	6
5	316	27,029	97,980	2,581	7
6	202	17,999	65,246	1,015	5
7	263	35,795	129,757	845	2
8	174	40,653	147,367	581	2
El. Total	1,500	149,916	543,445	7,770	14
High School Grades					
1	159	29,304	116,776	4,383	3
2	140	26,880	107,117	2,580	3
3	108	17,820	71,013	2,177	3
4	45	8,284	33,012	1,963	3
H. S. Total	452	82,288	327,918	11,103	3
Adult Group					
College	297	67,474	292,837	10,915	8
Letters	132	41,637	180,705	12,496	1
Adult Total	429	109,111	473,542	23,411	9
Grand Total	2,381	341,315	1,344,905	42,284	24*

* Does not equal the sum of the readers on the different parts because some readers worked on more than one part.

Some 24 different persons contributed their analyses to one or more parts of this study. They were instructed to record each time they encountered something in their reading of the specimens which made them stop and look a second time at what they were reading in order to deter-

mine what the writer meant.[6] Specific directions were given to the effect that they were not to let such things as misspellings, re-writings, crowdings or erasures enter their results as illegibilities. Such things as these were recorded, but separate from the specific illegibilities. If the readers were unable to record the illegibilities in some such category as "a like o," "g like ej" or "e closed," they copied as best they could the specific form of the illegibility and entered a tally mark opposite the reproduction. In case of doubt as to what the letter might be, the intent of the

TABLE II

NUMBER AND PERCENTAGES OF FORMS OF ILLEGIBILITIES COMMON TO ALL THREE LEVELS, COMMON TO ANY TWO OF THEM AND PECULIAR TO ANY ONE OF THEM

Letter	Forms common to						Forms peculiar to				Total Number of Forms
	All Levels	%	El. & H.S.	H.S. & Ad.	El. & Ad.	%	El.	H.S.	Ad.	%	
a	5	25	1	–	2	15	4	6	2	60	20
b	4	14	3	1	3	24	4	9	5	62	29
c	3	38	1	–	–	12	2	–	2	50	8
d	4	17	1	2	2	21	6	7	2	62	24
e	3	33	–	–	–	–	4	–	2	67	9
f	3*	8	4	3	4	28	5	12	8	64	39
g	2	8	2	3	2	27	6	9	2	65	26
h	3	13	2	2	2	26	6	4	4	61	23
i	6	32	2	–	3	16	2	2	4	52	19
j	–	–	–	–	–	–	4	1	1	100	6
k	2	12	4	2	2	47	3	4	–	41	17
l	2	15	–	–	1	8	3	3	4	77	13
m	3	25	1	–	1	8	2	1	4	67	12
n	3	15	2	1	4	30	4	3	4	55	20
o	7	29	2	2	2	25	7	2	2	46	24
p	1	3	5	2	2	25	8	9	9	72	36
q	–	–	–	–	–	–	1	4	1	100	6
r	6	22	3	–	2	19	9	4	2	59	26
s	5	19	1	3	1	19	6	9	1	62	26
t	6	19	1	1	1	10	8	10	4	71	31
u	4	19	–	–	2	15	9	3	3	71	21
v	3	21	1	–	2	21	1	4	3	58	14
w	4	18	1	–	2	14	7	4	4	68	22
x	–	–	–	–	–	–	1	1	–	100	2
y	2	9	3	–	–	14	5	8	3	77	21
z	1	25	–	–	–	–	–	2	1	75	4
Totals	82	16	40	22	40	20	117	121	77	64	499

* This means that three forms, or practically eight percent of the forms in which "f" appeared illegible, were common to all three age levels, four were common to only the elementary and high-school levels, three were common to only the high-school and adult levels, etc.

[6] This procedure may seem to have been unreliable, but quite the contrary was found to be the case. Not only the gross correlational method of comparison but also a minute analysis of the particular forms of illegibilities showed a high agreement, for this type of study. In the case of the former method, a rank correlation between the frequencies of letter illegibility, as recorded by one person, and the frequencies of letter illegibility, as recorded by two other persons working together on the same set of over 400 high school papers, was found to be $+.80 \pm .05$. Similar computation on the results of one person's analyzing twice the same set of 45 high school English papers, without his knowing the purpose of the duplication of the work, gave $+.96 \pm .01$.

writer was checked by means of the context. Tabulations were kept separate for each grade or group, and were later combined into totals which were used to characterize some major grouping such as the elementary grades, high school, or adult. The actual illegibility frequencies were transmuted into terms of frequency-per-one-hundred-thousand running letters. Throughout the study, an attempt was made to have all tabulations as specific and extensive as possible, the assumption being that it was at all times more desirable to have a mass of specific data that could later be synthesized than it was to have gross records which could only with great difficulty and much inaccuracy be further analyzed.

Results.—A total of 499 different forms of illegibilities were recorded. According to Table II, only 16 percent of this total were common to all three of the major age groups used—the elementary, the high school, and the adult. An additional 20 percent were common to only two of these three groups. The fact that 64 percent of the forms were peculiar to one group or another is suggestive remedially. Only six letters—"e,"

TABLE III

FREQUENCIES PER 100,000 RUNNING LETTERS WITH WHICH EACH LETTER APPEARED ILLEGIBLE AND THE PERCENTAGES OF THE TOTALS THE ILLEGIBILITIES OF EACH LETTER REPRESENTED

Letter	Elem. Fr.	Elem. %	H.S. Fr.	H.S. %	Adult Fr.	Adult %	Total Fr.	Total %
a	153	11	277	9	377	8	269	8
b	89	6	278	9	180	4	172	5
c	16	1	47	1	70	1	44	1
d	126	9	260	8	266	5	214	7
e	167	12*	392	12	904	18	495	16
f	39	3	120	4	155	3	102	3
g	31	2	53	2	66	1	50	2
h	80	6	154	5	235	5	157	4
i	57	4	158	5	362	7	195	6
j	1	—**	2	—	1	—	1	—
k	19	1	49	2	30	1	31	1
l	34	2	49	2	100	2	62	2
m	16	1	10	—	27	1	19	1
n	55	4	63	2	457	9	205	6
o	73	5	181	6	185	4	143	5
p	15	1	113	3	84	2	65	2
q	1	—	3	—	1	—	1	—
r	167	12	290	9	440	9	302	9
s	47	3	132	4	273	6	152	5
t	134	10	515	16	600	12	402	13
u	23	2	8	—	15	—	17	1
v	11	1	22	1	35	1	23	1
w	22	2	47	1	35	1	34	1
x	—	—	—	—	—	—	—	—
y	10	1	25	1	31	1	22	1
z	1	—	4	—	2	—	2	—
Total	1,387		3,252		4,931		3,179	

* This shows that the letter "e" was found illegible 167 times in every 100,000 running letters written by the elementary group, and contributed 12 percent of the total number of illegibilities of that group.

** These dashes indicate percentages of less than .5.

"e," "j," "q," "x," and "z"—had less than ten forms in which they appeared illegible. Five letters had from 10 to 19 illegibility forms, while three had over 30 forms of illegibilities. Nearly half (12) of the letters of the alphabet, then, appeared illegible in from 20 to 29 different forms. The implications concerning the specificity of remedial procedure, with respect to the different age-level groupings, seem quite obvious.

Table III shows the frequencies per 100,000 running letters with which the letters of the alphabet appeared illegible and the extent to which each letter contributed to the total number of illegibilities at each level, as expressed in percentages. It can be seen that the illegibilities of the four letters "a," "e," "r," and "t" were among the first five in importance in each major age group and that they together contributed 45, 46, and 47 percent to the elementary, high-school, and adult groups respectively. Taking all the letters together, the high-school students wrote 136 percent more illegibly than did the elementary school children, but were surpassed 52 percent by the adults. It is interesting to note that the adults wrote more than three times more illegibly than did the elementary school children.

When one considers the most frequent forms of illegibilities which accounted for approximately one-half of all the illegibilities among lower case letters, as shown in Table IV, one is impressed by two things, namely, the small number of forms, as compared with the total number recorded at each level, and the degree of consistency with which certain forms ap-

TABLE IV

THE MOST FREQUENT FORMS OF ILLEGIBILITIES ACCOUNTING FOR APPROXIMATELY FIFTY PERCENT OF ALL ILLEGIBILITIES AMONG LOWER CASE LETTERS, THEIR FREQUENCIES AND THE PERCENTAGES THEY CONTRIBUTED TO ALL ILLEGIBILITIES

Elementary			High School			Adult			Total		
Fr.	%	Form	Fr.	%	Form	Fr.	%	Form	Fr.	%	Form
145	11	e closed*	373	11	e closed	882	18	e closed	473	15	e closed
81	6	d like cl	265	8	t like l	363	7	n like u	155	5	n like u
56	4	a like o	152	5	a like u	216	4	d like cl	148	5	d like cl
47	3	a like u	146	4	d like cl	200	4	i, no dot	131	4	t like l
45	3	a like ci	120	4	r like i	188	4	a like o	114	4	r like i
42	3	t, cross above	94	3	i, no dot	185	4	r like i	111	4	i, no dot
			91	3	o like a	182	4	t, cross above	103	3	a like o
41	3	r like i	84	3	h like li				102	3	a like u
36	3	b like li	63	2	r like s	151	3	h like li	93	3	t, cross above
35	3	t like l	55	2	t, cross right	148	3	t, cross right			
35	3	i, no dot							88	3	h like li
34	2	r like half n	53	2	r like half n		51		68	2	b like li
33	2	o like a	52	2	t, too short	(9) of 220 forms)				51	
30	2	h like li	50	2	n like u				(11 of 498 forms)		
27	2	n like u	50	2	d like cl						
	50			53							
(14 of 279 forms)			(14 of 264 forms)								

* This means that "e closed" occurred 145 times in every 100,000 running letters written at the elementary level and accounted for 11 percent of all the illegibilities at that level.

peared at the different levels. Of particular interest is the fact that, of the nine forms of illegibilities which accounted for 50 percent of all the illegibilities recorded for the adult level, six were common to all three levels. The illegibility "e closed" accounted for nearly twice as many illegibilities in the elementary and adult groups and practically 50 percent more than its nearest competitor in the high-school group. With one exception, the other five, "d" like "cl," "r" like "i," "i" not dotted, "h" like "li," and "n" like "u" showed no marked tendency either to increase or to decrease in relative importance going from the elementary grades to the adult group. This exception, "n" like "u," had a percentage from four to five times greater among the adult illegibilities than among those in the lower age groups.

As for the analysis of capital letter illegibility, out of a total of 753 illegibilities tabulated for these letters, 439 of them were recorded for the letter "I." The malformation of "I" accounted for at least 55 percent of the capital letter illegibilities in the elementary group, and for no less than 43 percent of all the illegibilities at the high-school level, but what were overshadowed by the importance of the failure of adults to close their "D's," which latter condition accounted for at least 30 percent of the illegible capitals of adults.

A grouping of the different illegibilities with respect to common types of errors in the writing process provided very interesting possibilities remedially and preventively. For instance, the failure to close letters, Type 1, Table V, was found to be the most consistently serious illegibility habit, as indicated by the percentages of 24, 20 and 16 for the elementary, high-school and adult groups respectively. The tendency to close loops unnecessarily, especially above the lines, rose from 13 percent in the elementary level to 20 percent in the adult level. The tendency to loop strokes unnecessarily fluctuates from a 12 percent importance in the elementary group to one of 27 percent in the high-school, and goes back to 12 percent for the adults. While Types 20 to 24 contribute less than one-half of one percent to the total of the illegibilities recorded, they are included here as interesting negative findings.

The upshot of this phase of the work seems to be that the concentration on three or four types of difficulties would focus attention on those groups of faulty habits which account for about one-half of the total illegibility problem. Each of the eight illegibility habit groupings shown in Table V contributed five percent or more of the 42,284 illegibilities. The possibilities of recombining the 24 groupings in this table are nu-

TABLE V

ANALYSIS OF LETTER MALFORMATIONS

Type	Percentages contributed			
	El.	H.S.	Ad.	Total
1 Failure to close letters (a, b, f, g, j, k, o, p, q, s, y, z)	24	20	16	18
2 Top loops closed (''l like t,'' ''e like i'')	13	14	20	18
3 Looping non-looped strokes (''i like e'')	12	27	12	16
4 Using straight up-strokes rather than rounded strokes (''n like u,'' ''e like i,'' ''h like li'')	11	10	15	13
5 End stroke difficulty (not brought up, not brought down, not left horizontal)	11	6	9	9
6 Difficulty crossing ''t''	5	5	9	7
7 Difficulty dotting ''i''	3	5	5	5
8 Top short (b, d, f, h, k, l, t)	6	7	3	5
9 Letters too small	4	5	4	4
10 Closing c, h, r, u, v, w, y	4	3	3	3
11 Part of letter omitted	4	4	3	3
12 Up-stroke too long	2	3	1	2
13 Letters too large	2	1	–*	1
14 Beginning stroke off line	–	3	1	1
15 Bottom short (f, g, j, q, y, z)	2	1	–	1
16 Using rounded up-strokes instead of straight ones (''i like e,'' ''u like ee'')	–	1	2	1
17 Down-loop turned incorrectly	1	1	1	1
18 Excessive flourishes	–	1	1	1
19 Part added to letter	–	–	1	1
20 Down-stroke too long	1	1	–	–
21 Up-loop turned incorrectly	–	–	–	–
22 Down-loop closed	–	–	–	–
23 Printing	–	–	–	–
24 Palmer ''r''	2	1	–	–
25 Unrecognizably recorded	2	1	3	3
26 Unclassified	10	9	9	9

* These dashes represent frequencies which accounted for less than one-half of one percent of the total.

merous and the remedial and preventive implications of these new types of difficulty should be of great importance to those interested in the teaching of handwriting.

Conclusions.—In light of the above data, certain general statements can be made for the whole study:

1. There were more forms of illegibilities peculiar to the different age groups than there were common to two or more age levels. Only sixteen percent of the 499 different forms of illegibilities were found common to the elementary, high-school, and adult groups, while 64 percent of them were peculiar to some one level.

2. The illegibilities of only four letters (a, e, r, and t) contributed 45, 46, and 47 percents to the elementary, high-school, and adult groups respectively.

3. Only fourteen different forms of illegibilities in the elementary and high-school groups and nine in the adult group contributed one half of all the 42,284 specific illegibilities recorded; six of these were common to all three levels. Writing ''e'' like ''i'' resulted in 15 percent of all illegibilities.

4. Only four types of difficulties in the formation of letters caused over one-half of all the illegibilities. These were: (a) the failure to close letters, (b) closing looped strokes, (c) looping non-looped strokes, and (d) using straight up-strokes rather than rounded strokes.

5. The gross frequency with which illegibilities appeared tended to increase with age. The high-school students wrote 136 percent more illegibly than did the elementary school children, per constant amount of material, while the adults wrote 52 percent more illegibly than did the high-school students, or over 350 percent worse than the elementary pupils.

Implications.—The major implications of these conclusions seem to be at least two. In the first place, preventive and corrective work in handwriting can be not only quite definite but also highly concentrated on a very few aspects of the total problem.[7] Any one of at least three lines of evidence would seem to substantiate this. It will be recalled that the illegibilities of only the four letters "a," "e," "r," and "t" contributed no less than 45 percent of all the illegibilities recorded at any age level. The fact that only a very small number of forms of illegibilities occurred so frequently that they represented one-half of all the illegibilities found is at once suggestive of the specificity of the preventive or remedial measures. And then it will be remembered that the prevention or correction of only four types of bad writing habits would improve legibility at least 50 percent. It does not seem unreasonable to hazard the guess that preventive and remedial efforts directed along a combination of all three of these lines might eliminate three-fourths of all illegibilities encountered.

The second suggestion is this. It would be possible, and probably highly desirable, to evaluate existing systems of teaching cursive handwriting in light of the analyses made in this study. For instance, knowing the types of incorrect movements made in the formation of letters

[7] Illustrative of devices that can be of use in such an approach are two charts which greatly facilitate the analysis of handwriting from the standpoint of specific illegibility. The Presseys have prepared a "Chart for Diagnosis of Illegibilities in Handwriting" and the writer has constructed a "Chart for Diagnosis of Illegibilities in Written Arabic Numerals," both of which are published by the Public School Publishing Company, Bloomington, Illinois. The successful use of the former in an experiment to determine the extent to which specific illegibility habits could be corrected as well as the extent to which general quality and legibility could be improved was reported by Hilda Lehman and Luella C. Pressey in an article "The Effectiveness of Drill in Handwriting to Remove Specific Illegibilities" which appeared in *School and Society*, XXVII, May 5, 1928.

and knowing the relative importance of these movements, as determined either by the frequencies with which they appeared or by the percentages which they contributed to the whole illegibility situation, it would be possible to analyze in a similar way the amount of practice on different types of strokes or movements recommended in the manuals of the various handwriting systems in order to determine whether or not greater emphasis might be placed on certain aspects heretofore neglected. If such a study were made and instructional procedure modified accordingly, it would be a relatively simple matter to analyze the product of the new system and compare the results it produces with the data presented here, the efficacy of the new method being determined by the extent to which illegibilities had been reduced.

AN EXPERIMENT IN ADULT LEARNING OF FRENCH AT THE MADISON, WISCONSIN, VOCATIONAL SCHOOL

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THE PROBLEM AND ITS HISTORY

IN October, 1929, an opportunity was afforded the writer to carry on an experiment in adult education in the Madison, Wisconsin, Vocational School. It was to teach in the night school a beginners' class in French and a second more advanced section in the same subject, which courses will be designated as French I and French II respectively in this study. All of these students were taking the subject primarily as an elective and not as a prerequisite for a prescribed course and hence differed in this respect from younger students in secondary schools or colleges who frequently take foreign languages only to meet the requirements for a school or college diploma and not because of any notion of preference for them. The immediate purpose of the experiment was to learn whether adults could learn a foreign language more or less thoroughly than school children or even university students, in other words to ascertain what could be accomplished by students beyond the average school or college age when subjected to the same amount of instruction, the same methods, the same teacher, and the same examinations for measuring the results.

Probably up to the present time the most authoritative study related to the problem we undertook is that of the well-known Professor of Education, E. L. Thorndike of Columbia University.[1] This work presents the data of many controlled experiments to demonstrate the amount and changes in the ability to learn in childhood, youth, early and middle adult age, and old age. For our purpose we shall need to refer to only two or three investigations in Thorndike's volume as they have a direct bearing on our own inquiry. In one experiment dealing with the gains made on standardized tests in French by students in two large evening high schools it was estimated that compared with students from 20 to 24 those from 14 to 16 made gains of 59 percent, that those from 17 to 19 gained 86 percent, that those from 25 to 29 gained 89 percent, and that those who were 30 or over gained 86 percent. In other words, it is evident that the adults made better gains than the two youngest groups,

[1] Thorndike, E. L. *Adult Learning.* (New York: The Macmillan Company, 1928), p. 269.

although the oldest group did less well than those from 20 to 24. Similar experiments in German, Latin, and Spanish brought out approximately the same results.

In reporting the outcome of twelve experiments with Esperanto, Thorndike, who approaches the problem of adult learning from many angles, makes the following substantiated statements: "Results from other experiments agree with these, in showing that the difference between age 22 and age 40 in ability to learn a logical systematic language is small, and is confined largely to the oral test."....."Pupils 9 to 18 years old in a good private school, having over twice as much class study as the group 35 years old and over (and more than twice as much home study, if they did not shirk their assignments) gained little more than half as much. Younger groups of ages around 9 and 11 show still slower rates of gain, despite the fact that in one group they were children of exceptionally high intelligence."[2]

A piece of research carried on by Dr. Chen-nan Li of Yale for his doctor's thesis, "Factors Conditioning Achievement in the Modern Foreign Languages," 1927, deals with the variation of achievement with grade at which study is begun and hence throws light on our inquiry.[3] Through an administration of the Alpha French Test (Vocabulary, Grammar, Silent Reading, and Composition) it was shown that beginners in French in the tenth and the eleventh grades tended to secure higher median scores than the beginners in the eighth or ninth grades. Although we are warned that because of the variation in objectives, content, method, pace, teaching and student ability at the different levels we should not conclude in favor of a late start in foreign language study, it is significant, however, to note that those who did start late made a better showing on the objective tests. A more carefully controlled experiment in the ninth, tenth, and eleventh grades of the Cleveland schools under Dr. De Sauzé demonstrated beyond a doubt that the seventh grade made significantly lower scores in all the different parts of the Alpha French Test than the higher grades and hence pointed to the same tendency, namely, better results in the upper courses where the students were older, although an important fact must not be overlooked, to wit, that these tests do not measure, except indirectly, oral and aural achievement.

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[2] *Ibid.*, p. 46.

[3] Henmon, V. A. C. *Achievement Tests in the Modern Foreign Languages.* (New York: The Macmillan Company, 1929), pp. 322-329.

Another controlled experiment bearing more directly on our case was carried out not long ago by M. M. Fraser of the Foshay Junior High School, Los Angeles, and C. C. Crawford of the University of Southern California and reported under the title, "A Comparison of Adults with Junior High School Students as to Progress in Learning Spanish."[4] There were four groups of students of twenty-five each so that there was a first semester class in Junior High School and another in adult evening high school paired off and also a third semester class at both levels matched. The intelligence quotients of the younger students ranged from 112 to 147, those of the adult groups were not available; the total time of instruction for both pairs was the same, but the distribution of class time favored the younger students. By comparing the scores obtained from an administration of the Stanford Spanish Test (Grammar, Vocabulary, and Paragraph Meaning) the authors reveal a uniform and clear-cut superiority of achievement in the abilities measured on the part of the adult groups. Likewise a comparison of the coefficients of correlation between the three types of language ability for the adults and for the junior high school students favored the adults from the point of view of a harmonious and proportionate mastery of the language.

During the three years that our experiment at the Madison Vocational School continued there were about 150 students who registered for the beginners' class either as regulars or auditors, and 55 who signed up in similar fashion for the next higher course; of the former only 39 completed all the work and of the latter only 32 finished the course. The most usual reason for dropping out of the classes, where it could be ascertained, was not lack of ability or interest but rather that of time, as most of the students had some occupation or other that kept them employed during the day. The average age of the beginning group was about 33 years, the range being from 18 to 60; the average age of the more advanced section was about 38, the range being from 20 to 62. (These figures were based on both, on stated ages and on estimated ages.) Hence, it can be said with no fear of contradiction that the two groups were adults in every sense of the word with all the advantages and disadvantages attributable to the same. A chance sampling of 43 cases of the two groups that took the 1928 edition of the Psychological Examination published by the American Council on Education gave a median

[4] *Modern Language Forum* for April, 1931, pp. 40-42.

score of 123 compared with 138 for the national median score established on over 30,000 freshmen in 112 colleges; the upper quartile and the lower quartile of the Madison Vocational School group were 166 and 69 compared with 179 and 99 for the college group. Therefore, it can be stated that insofar as such a test measures the intelligence or aptness of human beings the college freshmen make a better showing from this point of view.

TABLE I

PROFESSION AND TRAINING OF FRENCH I IN THE MADISON, WISCONSIN, VOCATIONAL SCHOOL FOR 1929-30, 1930-31, 1931-32

Student	Trade	Education	Grade
1. GG	Nurse	B. S.	A
2. HH	Nurse	2 yrs. college	A
3. II	Nurse	12 H. S. Grad.	A
4. JJ	Secretary	Business College	A
5. KK	Clerk (Student)	1 yr. college	A
6. LL	Clerk	2 yrs. college	A
7. MM	Nurse	A. B.	A
8. NN	Student	1 yr. college	A
9. OO	Chemist	A. B.	B
10. PP	Engineer	B. S.	B
11. QQ	Nurse	A. B.	A
12. RR	Student	1 yr. college	A
13. SS	Homemaker	12 H. S. Grad.	B
14. TT	Housewife	St. Tea. Col. Grad.	A
15. UU	Nurse	1 yr. college	B
16. VV	Architect draftsman	A. B.	A
17. WW	Housewife	1 yr. college	B
18. XX	Nurse	B. S.	A
19. YY	R. N. Inst. Nursing	2 yr. H. S.	B
20. ZZ	Housewife	12 H. S. Grad.	B
21. AAA	Librarian	A. B.	A
22. BBB	Music Teacher	12 H. S. Grad.	A
23. CCC	Homemaker	12 H. S. Grad.	B
24. DDD	Stenographer	12 H. S. Grad.	A
25. EEE	Bank Teller	A. B.	B
26. FFF	Nurse	B. S.	B
27. GGG	Seamstress	Elementary School	B
28. HHH	Stenographer	12. H. S. Grad.	B
29. III	Bookkeeper	12 H. S. Grad.	B
30. JJJ	Office worker	12 H. S. Grad.	B
31. KKK	Clerk	12 H. S. Grad.	C
32. LLL	Clerk	B. S. Normal School	B
33. MMM	Homemaker	Elementary School	C
34. NNN	Housewife	2 yrs. college	B
35. OOO	Stenographer	12 H. S. Grad.	B
36. PPP	Housewife	2 yrs. H. S.	C
37. QQQ	Stenographer	1 yr. H. S.	C
38. RRR	Clerk	12 H. S. Grad.	C
39. SSS	Housewife	2 yrs. H. S.	C

A study of Tables I and II in regard to the profession or occupation of the cases involved reveals that the housewives or homemakers predominate in number, there being 21 (30 percent), next comes the stenographers, clerks, and the like with 18 (25 percent), then appear the nurses with 13 (18 percent), teachers and others in technical professions follow with 14 (20 percent), and finally come those of miscellaneous callings with 5 (7 percent). An examination of the same tables in order to learn about the educational background of the 71 cases included in the

experiment demonstrates that 24 (34 percent) are college graduates, 15 (21 percent) have had one or two years of college training, 18 (25 percent) are high school graduates, 8 (11 percent) have taken one or two years of high school, and 5 (7 percent) have had only elementary school training, and 1 (1.4 percent) has taken a business college course.

TABLE II

PROFESSION AND TRAINING OF FRENCH II IN THE MADISON, WISCONSIN, VOCATIONAL SCHOOL FOR 1929-30, 1930-31, 1931-32

Student	Trade	Education	Grade
1. A	Nurse	P. S.	A
2. B	Housewife	B. M.	A
3. C	Clerk	2 yrs. college	A
4. D	Librarian	A. B.	A
5. E	Nurse	B. S.	A
6. F	Nurse	2 yrs. college	A
7. G	Nurse	12 H. S. Grad.	A
8. H	Psychologist	A. B.	A
9. I	Clerk	2 yrs. college	A
10. J	Homemaker	12 H. S. Grad.	B
11. K	Homemaker	12 H. S. Grad.	A
12. L	Chemist	M. A.	B
13. M	Secretary	12 H. S. Grad.	B
14. N	Teacher	St. Tea. Col. Grad.	B
15. O	Housewife	U. W. Grad.	C
16. P	Clerk (Student)	1 yr. college	B
17. Q	Housewife	2 yrs. college	C
18. R	Housewife	St. Tea. Col. Grad.	A
19. S	Nurse	A. B.	B
20. T	Homemaker	12 H. S. Grad.	B
21. U	Homemaker	1 yr. college	B
22. V	Homemaker	Normal School Grad.	B
23. W	Seamstress	Elementary School	B
24. X	R. N. Inst. in Nursing	2 yrs. H. S.	A
25. Y	Stenographer	12 H. S. Grad.	B
26. Z	Seamstress	Elementary School	B
27. AA	Housewife	2 yrs. H. S.	C
28. BB	Seamstress	Elementary School	B
29. CC	Housewife	2 yrs. H. S.	C
30. DD	R. N. Inst. in Nursing	2 yrs. H. S.	A
31. EE	Engineer	B. S.	B
32. FF	Homemaker	2 yrs. college	C

The instructor's procedure in the adult classes might be described as the eclectic method, that is, a combination of oral, aural, and written work, extensive and intensive reading (training in silent comprehension and translation). Aldrich, Foster, and Roulé's *Elementary French* (Ginn and Company), Eddy's *Beginning French* (University of Chicago Press), and Young's *French Grammar* (Ginn and Company) were respectively used in 1929-30, 1930-31, and 1931-32 in the beginning class (French I). In these classes the first year Pumpelly's *French Reader for Beginners* (Knopf), 97 pages, was read, the second year Cochran and Eddy's *Si Nous Lisions*, 168 pages, and Eddy's edition of *Pierrille*, 165 pages, (both by the University of Chicago Press), and the third year the same reading as for the second. Outside reading was encouraged by loaning the students books from the instructor's collection. The same method was also employed in French II (the nucleus of which had taken

French I). Aldrich, Foster, and Roulé's *Elementary French* was studied in this class in 1929-30 and also in 1930-31 and Maloubier's *Au Jour le Jour* (Heath) in 1931-32. In this advanced section in 1929-1930 the required reading consisted of Augier's *Le Gendre de Monsieur Poirier* (Hawkins' edition by Holt), 91 pages, and Michaud's *Conteurs Français* (Heath), 130 pages. In 1930-31 we read Ford and Hicks' *New French Reader* (Holt), 193 pages, and Mérimée's *Carmen et Autres Nouvelles* (Blondheim's edition by Heath), 131 pages. In 1931-32 we had time for only Mérimée's *Colomba* (Ford and Hicks' edition by Holt), 173 pages, as there were two weeks less teaching and as there was more oral drill than in the two preceding years. In addition to the required reading optional outside reading was encouraged by the teacher's offering the use of his own collection, by additional instruction, and by correspondence. Perhaps the best record in this respect was that made by student D of the class of 1929-30 and by student W of the class of 1931-32 in Table III. The former read nearly 600 pages in Claretie's *Pierrille*, Sand's *La Mare au diable*, Mérimée's *Colomba*, and Bazin's *Les Oberlé;* the latter also read approximately 600 pages made up of Hugo's *Les Misérables*, Sand's *La Mare au diable*, About's *Le Roi des Montagnes*, and Labiche's *Le Voyage de Monsieur Perrichon*. There were not a few cases in both French I and French II that read an extra play, novel, or volume of short stories.

The nearest class to French I of the Madison Vocational School at the University of Wisconsin taught by the present experimenter, is French Ia, first semester work. In the first section employed for comparison the new Fraser and Squair's *Complete French Grammar* (Heath) and Smith and Greenleaf's *French Reader* (Holt), 97 pages, were studied. In the next class of French Ia we took Eddy's *Beginning French*, Eddy's *French Work Book*, Cochran and Eddy's *Si Nous Lisions*, 168 pages, Cochran and Eddy's *Pierrille*, 165 pages, and Eddy's *Progress Tests in French*. In the third class of French Ia we had Fraser, Squair, and Carnahan's *Standard French Grammar*, Smith and Greenleaf's *French Reader*, 146 pages, and Cochran and Eddy's *Si Nous Lisions*, 168 pages. The closest to French II of the Madison Vocational School at the University is French Ib, second semester work. Only two of these classes taught by the instructor in the case were available for our purpose. In the first of these we used Huse's *Essentials of Written and Spoken French* (Harcourt, Brace and Company), Dumas' *Evasion du Duc de Beaufort* (Kitchen edition by Heath), 71 pages, Mérimée's *Colomba*

Robert edition by Heath), 172 pages, Labiche's *Le Voyage de Monsieur Perrichon*, (Zeek edition by Johnson Publishing Company), 108 pages. In the second of these classes we employed the same grammar and the same play as in the first and also Hugo's *Les Misérables* (Scribner), 138 pages, and Dumas' *Le Comte de Monte Cristo* (American Book Company), 133 pages.

A summary of the required intensive and extensive reading for the beginning adult class, French I, at the Vocational School shows an average per student of about 254 pages of graded reading as compared with about 248 pages per student for the beginning class, French Ia, at the University. For the more advanced sections in the adult classes, French II, the average per student was about 239 pages compared with 363 pages per student for the second semester classes, French 1b, at the University. There were eight students in the French II group that read in addition to the assigned work from 300 to 600 pages each, the average being about 375 pages, in contrast with eight students in the French 1b group that read in addition to the assigned work from 70 to 385 pages each, the average being about 220 pages: these of course were the exceptional students in both groups. This outside reading would raise the average per student for the second semester university group to about 420 pages against about 333 pages, the average per student for the more advanced adult group. The difficulty of the reading material was approximately the same for both groups.

THE RESULTS AND THEIR INTERPRETATION

To the beginning classes at both the Vocational School and at the University were administered the vocabulary part and the silent reading part of the American Council Alpha French Test and also the American Council French Grammar Test-Selection Type[5] and to the next higher sections in both institutions was given the whole battery of the American Council Alpha French Test, consisting of a vocabulary, a grammar, a silent reading, and a composition part. This testing was done at the end of the respective courses. No language aptitude tests were given at the beginning of the elementary courses nor were equivalent forms of the standardized language tests administered before the finals to bring out the relative amount of language knowledge gained between two fixed periods by the vocational group and the university group. As desirable and valuable as this information might be, it seemed advisable to do with-

[5] Both published by the World Book Company, Yonkers, N. Y., and Chicago, Ill.

out it rather than lose the adult students who, in spite of their real interest in the subject and their fine spirit dreaded being examined more than did the younger university group.

As we have already called attention to the profession and training of the two adult groups presented in Tables I and II, we shall not dwell on these points any further. We should next state that the grades given in these tables are the instructor's marks for the courses established independent of the results of the standardized tests. In French I it will be noted that there were 16 A's, 17 B's, and 6 C's, a rather high estimate of the quality of the work done. How do these grades compare with those obtained from the administration of the American Council Alpha French Test[6] taken as an outside criterion? In Table III we have pre-

TABLE III

RESULTS IN COMPOSITE PERCENTILE RANKS OF THE A. C. ALPHA FRENCH TEST–FORM A ADMINISTERED TO FRENCH I AT THE MADISON, WISCONSIN, VOCATIONAL SCHOOL IN 1929-30, 1930-31, 1931-32

Student	1 sem. H. S. Basis	Student	1 sem. Col. Basis
1. GG	99.9	1. GG	99.5
2. HH	99.4	2. HH	97.9
3. II	99.3	3. KK	96.0
4. JJ	99.0	4. II	94.4
5. KK	98.0	5. MM	92.0
6. LL	98.0	6. JJ	92.0
7. MM	97.0	7. QQ	90.0
8. NN	96.7	8. LL	84.0
9. OO	96.0	9. OO	81.8
10. PP	96.0	10. PP	78.0
11. QQ	95.0	11. RR	78.0
12. RR	94.0	12. SS	77.0
13. SS	93.0	13. NN	76.7
14. TT	92.0	14. TT	73.5
15. UU	91.8	15. UU	72.5
16. VV	89.5	16. VV	66.0
17. WW	89.0	17. YY	63.4
18. XX	88.0	18. WW	63.0
19. YY	87.8	19. FFF	54.4
20. ZZ	84.0	20. XX	53.0
21. AAA	84.0	21. GGG	53.0
22. BBB	82.4	22. ZZ	50.0
23. CCC	79.0	23. BBB	48.6
24. DDD	78.0	24. EEE	44.0
25. EEE	78.0	25. LLL	43.2
26. FFF	76.0	26. AAA	43.0
27. GGG	75.0	27. JJJ	42.0
28. HHH	74.0	28. DDD	40.0
29. III	73.0	29. CCC	39.0
30. JJJ	68.0	30. HHH	32.2
31. KKK	67.8	31. NNN	31.0
32. LLL	65.9	32. III	29.0
33. MMM	64.0	33. MMM	27.7
34. NNN	63.5	34. KKK	24.2
35. OOO	62.0	35. PPP	19.0
36. PPP	51.0	36. OOO	16.0
37. QQQ	48.5	37. QQQ	14.0
38. RRR	38.0	38. RRR	9.0
39. SSS	21.0	39. SSS	3.0
Q_3	96.0	Q_3	78.0
Median	84.0	Median	53.0
Q_1	68.0	Q_1	32.0
Mean	80.3	Mean	56.2

[6] Omitting the composition part and substituting the A.C. French Grammar Test-Selection Type for the Coleman Grammar Test.

sented the results in composite percentile ranks on the standardized tests given to the beginning adult group, first on a one semester high school basis and next on a one semester college basis with the medians, means, and quartiles below. Assuming a normal distribution and a five point marking scale as follows—A=P.R. 100–94, B=P.R. 93–70, C=P.R. 69–32, D=P.R. 31–8, E=P.R. 7–0, on the high school basis there were 12 A's, 17 B's, 9 C's, and 1 D. The significance of the adult achievement in French I compared with that in first semester high school may be seen by matching the quartiles and medians of the composite percentile ranks of the former and those of the latter established on a national basis; the adults have a Q_3 of 96 and the high schools one of 77, the former attain a median of 84 compared with 57 for the latter, the first have a Q_1 of 68 and the second one of 28. A study of the adult cases shows that 64 percent of them did as well as the highest 25 percent of the high school students and that all but four, or 90 percent of them, did as well as the upper half of the high school students of the country. When it is taken into consideration that the average number of high school recitations per semester is over twice that in the adult group here examined, the ratio being about 90 to 42, the superiority of the achievement of the latter over that of the former is all the more striking and convincing.

As illuminating and pertinent to our problem as the first basis of comparison may be, namely, that on the high school plane, that on the college level permits of a closer control of the investigation as it allows an examination of the teaching done by the present writer in the Vocational School and the University in fairly comparable classes. An inspection of Table IV discloses the results in composite percentile ranks of the American Council Alpha French Test (with changes mentioned above) administered to three classes of French Ia, first semester level at the University. On this standardized test we obtained for the upper quartile 72.5, for the median 54.5, for the lower quartile 37.5, and for the mean 55.6 in comparison with Q_3 78, median 53, Q_1 32, and mean 56.2 with the adult group in the Vocational School as set forth in Table III. Assuming again a normal distribution and a five point marking scale as above, we have for the adult group 4 A's (10 percent), 11 B's (28 percent), 15 C's (38.5 percent), 8 D's (20.5 percent), and 1 E (3 percent), and for the university group 1 A (2 percent), 14 B's (26 percent), 31 C's (57 percent), and 8 D's (15 percent). It is obvious that the former group has a larger proportion of high marks than the latter and hence a smaller proportion of fair and low marks than the latter. On the basis

of classification of language students inaugurated at Wisconsin in 1930 38 percent of the adults would be advanced one or more semesters beyond the first semester, whereas only 28 percent of the university students would be treated in the same way. On this same plan of those left one of the adult group would be failed and all the rest, both adults and college students, would be normally placed, that is, given credit for one semester of college French. Another method of bringing out clearly the relative achievement of the two groups at the beginning level is to compare their means in the composite percentile ranks on the standardized tests. As the mean for both groups is practically 56, then we may claim that if the Vocational School adult group accomplished in 42 hours of instruction in French I as much as the University of Wisconsin group did in 64 hours in French Ia, that is, in two-thirds of the time, then it would probably have done 1.33 as much French in three-thirds of the time.

TABLE IV

RESULTS IN COMPOSITE PERCENTILE RANKS OF THE A. C. ALPHA FRENCH TEST ADMINISTERED TO FRENCH Ia AT THE UNIVERSITY OF WISCONSIN IN 1926, 1930, 1931—ALSO TEACHER'S MARKS

Student	1 sem. Col.	Tea. Mark		Student	1 sem. Col.	Tea. Mark
1	95	A		28	53	D
2	91	B		29	53	D
3	87	B		30	51	D
4	86	B		31	49	B
5	86	B		32	49	B
6	84	B		33	49	C
7	83	C		34	49	B
8	81	B		35	49	C
9	79	A		36	47	B
10	78	B		37	46	A
11	76	A		38	44	B
12	76	C		39	44	C
13	74	B		40	38	B
14	72	B		41	37	B
15	70	C		42	36	C
16	67	B		43	35	D
17	66	D		44	34	C
18	65	A	Q_3 = 72.5	45	34	C
19	65	C	Median = 54.5	46	33	B
20	64	C	Q_1 = 37.5	47	31	C
21	64	C	Mean = 55.6	48	31	C
22	64	B		49	30	C
23	62	B		50	28	C
24	62	B		51	27	B
25	60	C		52	26	C
26	55	A		53	18	E
27	54	C		54	13	B

We shall now turn our attention to the results in French II at the Madison Vocational School and to those in French Ib at the University of Wisconsin which are comparable from the point of view of grade of work and from that of the second semester level. It must be borne in mind that both groups were taught by the same instructor and their re-

[1] Cheydleur, F. D. "The Use of Placement Tests in Modern Languages at the University of Wisconsin," *The Modern Language Journal*, January, 1931.

sults measured by the administration of the whole battery of the American Council Alpha French Test at the end of the respective courses. A scanning of the teacher's grades in French I given in Table II brings out the fact that the adult group made 13 A's (41 percent), 14 B's (44 percent), and 5 C's (15 percent), a very high rating. By applying the same scale used in discussing Table III to the results presented in Table V on a two semester high school basis we shall find that this group made on the standardized test 8 A's (25 percent), 14 B's (44 percent), 10 C's (31 percent). While this check demonstrates very clearly the distinctly superior achievement of the adult group over the average two semester high school group, the difference is more strikingly shown by the following comparison of the quartiles and medians of the composite percentile ranks of the two groups, those for the adult group appearing first: Q_3 94 and 77, medians 82 and 54, Q_1 67 and 28. A study of these figures reveals that three-quarters of the adult group did as well as or better than half of the two semester high school students on whom the national

TABLE V

RESULTS IN COMPOSITE PERCENTILE RANKS OF THE A. C. ALPHA FRENCH TEST FORM A ADMINISTERED TO FRENCH II AT THE MADISON, WISCONSIN, VOCATIONAL SCHOOL IN 1929-30, 1930-31, 1931-32

Student	2 sem. H. S. Basis	Student	2 sem. Col. Basis
1. A	100	1. C	90
2. B	99	2. A	88
3. C	98.5	3. B	88
4. D	98	4. D	86
5. E	98	5. E	84
6. F	97	6. F	81
7. G	94	7. H	72
8. H	94	8. I	72
9. I	91	9. L	69
10. J	91	10. J	68
11. K	88	11. G	65
12. L	88	12. K	61
13. M	85	13. S	60
14. N	85	14. P	60
15. O	85	15. R	56
16. P	82	16. Q	56
17. Q	80	17. O	56
18. R	77	18. M	55
19. S	76	19. N	53
20. T	76	20. V	53
21. U	74	21. W	49
22. V	73	22. X	49
23. W	69	23. Z	48
24. X	67	24. U	48
25. Y	66	25. T	48
26. Z	66	26. Y	47
27. AA	64	27. BB	43
28. BB	63	28. EE	39
29. CC	60	29. AA	35
30. DD	59	30. DD	33
31. EE	57	31. CC	27
32. FF	52	32. FF	23
Q_3	94	Q_3	72
Median	82	Median	56
Q_1	67	Q_1	48
Mean	79.8	Mean	58.2

norms and quartiles were established. As a matter of fact all of the adults but one did as well as or better than the upper half of the high school students of the country.

Comparing now the adult and the university groups on the two semester college level from the point of view of the distribution of teacher's marks and that of the composite percentile ranks in terms of letter grades we obtain from the data presented in Tables V and VI, the following results. There were 13 A's (41 percent), 14 B's (44 percent), and 5 C's (15 percent) allotted by the instructor to the 32 adults as term marks compared with 4 A's (9 percent), 18 B's (39 percent), 18 C's (39 percent), and 6 D's (13 percent) distributed among the 46 university students as term marks. By weighting these letter grades in accordance with the grade point system in vogue at the university (A = 3, B = 2, C = 1, and D = 0) the 32 adults made 72 grade points or an average of 2.24 per adult and the 46 university students earned 66 grade points or an average of 1.43 per member of the latter group. Hence, there is found a difference of about eight-tenths of a grade point in favor of the adult student according to the instructor's rating. On the standardized tests the vocational school group won 8 B's (25 percent), 22 C's (69 percent), and 2 D's (6 percent), whereas the college classes scored 6 B's (13 percent), 36 C's (78 percent), and 4 D's (9 percent). By employing the same weighting system here as above it will be found that the average adult made a grade point average of about 1.2 and the average univer-

TABLE VI

RESULTS IN COMPOSITE PERCENTILE RANKS OF THE A. C. ALPHA FRENCH TEST ADMINISTERED TO FRENCH Ib AT THE UNIVERSITY OF WISCONSIN IN 1931 AND 1932—ALSO TEACHER'S MARKS

Student	2 sem. Col.	Tea. Mark		Student	2 sem. Col.	Tea. Mark
1	91	A		24	46	B
2	86	A		25	46	C
3	82	A		26	44	B
4	75	B		27	44	C
5	75	B		28	43	C
6	74	A		29	42	B
7	69	B		30	41	D
8	66	B		31	40	C
9	64	B		32	39	C
10	64	B		33	39	C
11	64	B		34	39	D
12	63	B		35	38	C
13	63	C		36	36	C
14	63	B	Q_3 = 63.8	37	35	D
15	61	B	Median = 46.7	38	34	C
16	59	C	Q_1 = 38.5	39	33	B
17	55	B	Mean = 50.7	40	33	C
18	53	C		41	33	C
19	53	C		42	32	D
20	53	B		43	29	C
21	52	B		44	29	D
22	51	C		45	28	C
23	46	B		46	26	D

sity student earned a grade point average of about 1, the difference of two-tenths being in favor of the adult. While the difference established on the outside criterion is so small as to be attributable to chance, still it points in the same general direction as the other evidence adduced in favor of the adult. However, if we note the difference in the time of instruction given to the two groups, namely, a maximum of 84 hours to the adult group and 128 hours to the university group and if we observe that the mean average percentile rank of the former is 58 while that of the latter is 51, we shall perceive that the vocational school group did 1.14 as much as the university group on the standardized tests in about two-thirds of the time. But if the older group could achieve 1.14 as much as the younger group in two-thirds of the time, it is very probable that it could achieve about 1.71 as much as the younger group in three-thirds of the time.

In order to safeguard the soundness of our conclusions we eliminated eight cases from Table V who were known to be repeaters of the French II group at the vocational school or to have had equivalent instruction before taking it. The effects of this elimination on the results of the testing as shown by the medians and quartiles at both the two semester high school level and the two semester college level are set forth in Table VII. Since a cross examination of the two tables reveals that the upper

TABLE VII

RESULTS IN COMPOSITE PERCENTILE RANKS OF THE A. C. ALPHA FRENCH TEST FORM A (WITHOUT REPEATERS) ADMINISTERED AT THE MADISON, WISCONSIN, VOCATIONAL SCHOOL IN 1929-30, 1930-31, 1931-32

Student	2 sem. H. S. Basis	Student	2 sem. Col. Basis
1. A	100	1. A	88
2. B	99	2. B	88
3. D	98	3. D	86
4. F	97	4. F	81
5. G	94	5. H	72
6. H	94	6. I	72
7. I	91	7. L	69
8. K	88	8. G	65
9. L	88	9. K	61
10. M	85	10. S	60
11. N	85	11. P	60
12. O	85	12. R	56
13. P	82	13. O	56
14. R	77	14. M	55
15. S	76	15. N	53
16. T	76	16. V	53
17. U	74	17. U	48
18. V	73	18. T	48
19. Y	66	19. Y	47
20. BB	63	20. BB	43
21. CC	60	21. EE	39
22. DD	59	22. DD	33
23. EE	57	23. CC	27
24. FF	52	24. FF	23
Q_3	94	Q_3	72
Median	85	Median	56
Q_1	73	Q_1	48
Mean	79.9	Mean	57.6

quartiles and the means of the whole group and the reduced group at the school level are practically the same and since there is a difference of only three points in their medians and of five points in their lower quartiles, and, furthermore, since the only difference at the college level is one of six-tenths in the means, it would appear to be absolutely safe to conclude that the inclusion of the eight cases in Table V has not invalidated our deductions as to the superiority of the adult achievement over that of the university group. Moreover, it should be added that in all of our first and second semester college groups there are also repeaters whose influence on performance is practically the same as that at the vocational school.

Another approach to the problem may be made from the data obtained from the administration of the standardized tests to the two groups under observation in this investigation, namely, an examination of the results on the individual parts of the language tests to bring out relative achievement. In Table VIII we have indicated the national norms and then the scores made by the adults and the university students in vocabulary, grammar, and silent reading at the first semester college level. An inspection of the figures at the first level will show that the scores of the adults in vocabulary and silent reading are superior to those of the younger group and superior to the national norms also; the grammar score, on the other hand is lower than both that of the university and that of the whole country. This latter result was due to a conscious lessening of stress on the subject by the instructor.[8] A glance

TABLE VIII

ACTUAL FRENCH ACHIEVEMENT OF THE MADISON VOCATIONAL SCHOOL ADULTS COMPARED WITH THAT OF THE UNIVERSITY OF WISCONSIN STUDENTS WHEN THE FORMER HAD TWO-THIRDS AS MANY LESSONS AS THE LATTER AS SHOWN BY THE MEDIANS ON THE DIFFERENT PARTS OF THE AMERICAN COUNCIL ALPHA FRENCH TESTS* (THE NATIONAL NORMS ARE INSERTED TO ENABLE FURTHER COMPARISONS)

Semester	Part of Test	Nat'l Norms	Median for Adults	Median for U. students	Difference in favor of Adults
First	Vocabulary	24	27.5	24.8	+ 2.7 (11%)
First	Grammar	36	29.0	32.3	− 3.3 (−11%)
First	Silent Reading	12	15.5	14.6	+ .9 (6%)
Second	Vocabulary	31	40.0	35.7	+ 4.3 (12%)
Second	Grammar	19	14.2	17.4	− 3.2 (−23%)
Second	Silent Reading	16	18.0	18.0	
Second	Composition	8	7.7	6.5	+ 1.2 (18%)

*In the first semester the A. C. French Grammar Test-Selection Type was substituted for the A. C. Alpha French Grammar Test and the Composition Part was omitted; in the second semester the whole battery of the A. C. Alpha French Test was administered.

[8] The reader is again reminded of the fact that in the first semester of the adult and university groups the A.C. French Grammar Test—Selection Type—was substituted for the grammar part of the A.C. Alpha French Test, and the Composition part of the latter was omitted; in the second semester at both places the whole battery was administered.

at the second semester results in the two groups discloses a difference in favor of the adults in vocabulary and composition, an equivalence between the two in silent reading, and again a loss in grammar. The two groups are both higher than the national norms in vocabulary and silent reading and lower in grammar and composition. We must not forget, however, that the means of the composite percentile ranks on the battery of tests, namely, 56.2 and 55.6, are practically the same in spite of the fact that the adults had only about two-thirds the amount of time in instruction as the university students.

In Table IX we have presented the probable French achievement of the adults on the different parts of the American Council Alpha Test had they taken as many lessons of instruction as the university students. A survey of the probable results reveals that the adults at both levels would very likely have made a better showing on every part of the test except in grammar than the younger group and would also have surpassed the national norms in all parts except grammar. We have indicated to the right the probable raw scores and the percentages in favor of the adults had the two groups had the same number of lessons. Although the indicated differences are large enough not to be attributable to chance, we have preferred to rest our claim concerning the superiority of the adults over the university group on the second semester college basis not on the differences of the results of the individual parts of the standardized test administered to the two groups but rather on the difference of the means or averages of the adults and the university students on the whole test. Hence, we will note again on Table V and Table VI that the mean of the older group is 58.2 and that of the younger is 50.7, which is a difference of 7.5 percentile points in favor of the vocational school group without any allowance for difference of time in instruction. From the formula for the reliability of the difference between

TABLE IX

PROBABLE FRENCH ACHIEVEMENT OF THE MADISON VOCATIONAL SCHOOL ADULTS COMPARED WITH THAT OF THE UNIVERSITY OF WISCONSIN STUDENTS IF THE FORMER HAD AS MANY LESSONS AS THE LATTER AS SHOWN BY THE MEDIANS ON THE AMERICAN COUNCIL ALPHA FRENCH TESTS

Semester	Part of Test	Nat'l Norms	Median for Adults	Median for U. students	Difference in favor of Adults
First	Vocabulary	24	32.6	24.8	+ 7.8 (31%)
First	Grammar	36	34.4	32.3	+ 2.1 (7%)
First	Silent Reading	12	18.4	14.6	+ 3.8 (26%)
Second	Vocabulary	31	47.4	35.7	+11.7 (33%)
Second	Grammar	19	16.8	17.4	− .6 (− 4%)
Second	Silent Reading	16	21.8	18.0	+ 3.8 (21%)
Second	Composition	8	9.1	6.5	+ 2.6 (40%)

two averages in terms of their standard error we may be practically certain, when we compare groups of adults like French II in the Madison Vocational School and university students like those in French Ib at Wisconsin, that 97 times in 100, the difference between the average scores will be in favor of the adults. (See Garrett's *Statistics in Psychology and Education*, pp. 128-133).

Before summarizing our conclusion we should note that besides age, intelligence, motivation, method, teacher, and other factors conditioning results that of time spent in preparation is of course important. Unfortunately for the completeness of our experiment the data covering this last item at the vocational school were inadvertently destroyed. From surveys made at Wisconsin and elsewhere it has been learned that the average college student spends from 1 to 2 hours per credit in the preparation of his subjects. Inasmuch as most of the adults included in our inquiry had some fixed occupation, it is reasonable to assume that the average member of the group did not have any more free time to devote to French than the average college student involved. Hence, it could be safely claimed that the adults did not enjoy an advantage in this respect over their younger competitors which might account in part for their superior achievement. As a matter of fact in this connection the element of fatigue resulting from the daily occupation, if taken into consideration, would place the adults at a disadvantage.

What may we deduce from our experiment in adult learning of French in the vocational school? Among other deductions the following would seem to be in order:

1) It would appear to substantially establish the principle that adults with an educational background ranging anywhere from an elementary school training to a college degree and with widely different occupational pursuits can surpass the achievement of younger university students at the same levels of instruction. While the result of our problem was to be anticipated from the earlier experiments carried on by Thorndike and others to which we have referred above, still as our experiment did not cover the same ground as the others it required proof.

2) It ought to demonstrate the fallacy of the popular belief that you cannot teach an old dog new tricks, for insofar as foreign language learning is concerned it would seem quite clear that the older person in vocational school of normal intelligence and some leisure through better motivation, application, and concentration may outstrip his younger brother in college with less clear-cut aims, industry, and singleness of purpose.

3) It also follows from our experiment that what has been demonstrated in regard to the superiority of achievement of adults in the learning of French compared with university students is equally true of their attainment compared with high school students in the same subject at the same levels of instruction.

4) It is reasonable to expect that similar experiments in other foreign languages under approximately the same conditions, namely, vocational school adults versus college or high school students would bring comparable results and that the plan could be extended to other standard subjects such as mathematics, science, history, and English. What we require to carry out the program are open-minded administrators, devoted teachers, and earnest students; others may be sloughed off without any loss to the true advance of technical or cultural learning.

5) The demonstration that the adult may hold his own with youth in the pursuit of knowledge should revivify the ideal of the fully developed man who like Goethe should ever strive after the good, the beautiful, and the true.

THE STUDENT'S ABILITY INDEX IN HIGHER EDUCATIONAL INSTITUTIONS

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THE writer has heretofore developed a student's ability index (SAI)[1] and demonstrated its practical application in the elementary school.[2] The next problem is to adapt the index so far as possible to the conditions prevalent in such institutions as the high school, college, or university.

The formula for this index as stated for elementary school students is as follows:

$$SAI = \frac{Mk}{CA} \times \frac{MGA}{GMk}$$

in which SAI is the student's ability index; Mk is the average of the student's marks assigned by his instructor for the term or year; CA is the student's actual chronological age at the time Mk is computed; MGA is the "mental grade age" or the average mental age of the students per grade (or year) at the same date and GMk is the "grade mark" or the average of the marks assigned to all students in the given grade and subjects.

The formula thus stated involves one factor, MGA, that appears to be specifically affected by normal conditions in higher institutions. To be sure other factors, especially such as pertain to marking systems and practice, are subject to greater variability than in the elementary school while the disturbing influences of variable curricula, changing environment and extraneous activities must render the formula as a whole less reliable as a measure of inherent ability. Some of these influences are presumably irregular and may be regarded as the accidental disturbances characteristic of higher school life which are, at least partially, eliminated by the law of averages when the data are in sufficient volume, while others doubtless are incapable of satisfactory control. On the other hand, the factor MGA, having a mental-age basis, appears to be subject to a definite biological disturbance which should be considered before attempting to apply the formula to the work of higher institutions.

[1] Banker, Howard J. "A Student's Ability Index from Teacher's Marks," *Journal of Educational Research*, XVII (May, 1928), pp. 357-364.

[2] Banker, Howard J. "The Practical Application of the Student's Ability Index," *Journal of Educational Research*, XVIII (November, 1928), pp. 282-289.
Banker, Howard J. "Correlation Studies of the Student's Ability Index," *Journal of Educational Research*, XX (June, 1929), pp. 31-37.

It has been shown in a previous paper[3] as well as indicated by the work of others, that during the high school period, or at adolescence, measurements for mentality seem to indicate a change of some sort. We may not say what that is nor are we concerned with its real nature so long as we may obtain therefrom a working hypothesis. At this period the student apparently no longer shows an increasing capacity to meet a situation for which he has not been in some degree specifically prepared by experience. The high school senior may do work well nigh impossible for the freshman not so much because he has greater innate capacity as because he has acquired greater ability from training. The college student may read Livy more readily than he could in high school not because of a superior intellect but because he is more familiar with the language. In other words while in pre-adolescent life nature appears to play the leading role in educational development, in later life nurture becomes an increasingly important factor in the process; but nurture must build its superstructure on the foundation which nature has laid. The total ability of the student is, therefore, the expression of an inherent natural capacity fundamental to a trained efficiency.

In the earlier years the educational curriculum is adapted to the changes of an enlarging capacity, in the later years the curriculum becomes more and more an adaptation to a preliminary training. In either case the curriculum demand on the student's total ability is always advancing but the ability to meet the demand is gradually shifted from natural capacity to nurtural capacity, that is, the ability to profit by experience. Hence the basis for an SAI in the more advanced educational years must be sought in what we may call the educational age rather than in the mental age. By educational age, as suggested from this discussion, is to be understood the mean chronological age at which students of the general population, if under uniform and continuous educational influence, may successfully meet any specified level of requirement in a standardized educational system.

For pre-school age children up to entering the kindergarten the mean educational age may doubtless be considered the same as the mean chronological age and also the mean mental age. This is essentially true throughout life but the educational system enters in as an assortative agency and by a process of selection which becomes gradually more drastic segregates the students so that any level of the educational system the

[3] Banker, Howard J. "Mental-Age Distribution in School Progress," *Journal of Educational Research*, XXIII (April, 1931), pp. 273-279.

mean chronological age, the mean mental age and the mean educational age of the students no longer synchronize. Through the elementary school period, as the writer has shown,[4] the mean chronological age per grade rises and falls in a characteristic curve, while the mean mental age rises gradually and quite uniformly throughout this period. The mean educational age in the school population may be expected to rise in keeping with the mental-age growth but with some advance over the latter in consequence of the increment of training.

Educators have encountered this problem but I do not know that they have satisfactorily solved it. McCall[5] tried to determine a mean educational age per grade from the mean chronological age as actually found in the schools but admitted that his method was imperfect and the results to be accepted as only temporary. Not only was his method crude and technically inaccurate as he freely admitted but it appears to the writer that his underlying principle involved an element of error. Instead of basing his "educational age" on a mean of the general population, which would have been relatively stable, he evidently sought to base it on the mean of a continuously selected group, that is, the actual chronological age of the successive school grades. His method, however, served him better than his principle. Adopting a uniform annual increment of 13 months, he obtained a straight line distribution for the mean ages per grade having a slope of about 47¼ degrees from the horizontal, whereas we have shown that the true mean chronological ages per grade which he evidently desired to obtain have the distribution of a skewed curve.

It is not possible to find by any direct method the mean chronological age per grade for the general population since the population as a whole never goes to school. At the very beginning there is some selection since obvious mental defectives are commonly excluded even from the first grade. For the first four years of the elementary school work the selective effect of the curriculum requirements is, chiefly, to produce a redistribution of the children from year to year, and does not materially involve the elimination of children from the population. So far as the general population is ever admitted to the school system it is present in these first grades and becomes assorted according to its ability to

[4] Banker, Howard J. "Age Distribution in the Grades as a Measure of Mentality," *Journal of Educational Research*, XIII (March, 1926), p. 158.

[5] McCall, William A. *How to Measure in Education*. (New York: Macmillan Company, 1922), pp. 32-38.

meet the educational requirements. For this period, therefore, the mean chronological age per grade represents approximately the mean educational age for the general population as nearly as it seems possible to obtain it.

From the work previously cited[6] it may be seen that the mean chronological age per grade rises for the first four years at a fairly uniform rate giving a straight line distribution at an angle of about $48\frac{3}{4}$ degrees with the horizontal of the fundamental base. This line may then be regarded as the line of distribution of mean educational ages per grade. After the fourth school year elimination of students from the school population becomes increasingly frequent and the mean chronological-age curve soon turns downward. We cannot, therefore, longer employ it as a guide since it has less and less relation to the general population and represents conditions only in a selected population.

Since the students who are unable to successfully meet the advancing requirements of the school work are soon eliminated from the school course, it would seem improbable that they materially affect the educational-age standards of the school system and we may assume that the line of mean educational age per grade continues as an extension of the straight line curve of the first three grades. This gives us a line whose equation is $y = 1.14x - .43$, based on coördinates having the origin at birth. With reference to the same origin, the equation for the line of mental-age distributions per grade throughout the elementary school as derived from columns 2 and 11 in Table 2 of the paper cited is $y = 1.036x + .16$. This latter line, therefore, has an angle with the horizontal of about 46 degrees. That is, for the pre-adolescent period of school life the line of distribution of the mean educational age rises from year to year at an angle ($48\frac{3}{4}°$) a little greater than the mental-age line (46°), reflecting the growth in mental age plus an increment of cultural acquisition.[7] Theoretically, if the whole population went to school, if every individual were endowed with the same mentality of uniform and unlimited growth possibilities, if the educational curriculum were perfectly standardized and if every student progressed regularly from year to year through the school system, assumptions not inconsistent with much of our school practice, it would follow that the

[6] Banker, Howard J. "Age Distribution in the Grades as a Measure of Mentality," *Journal of Educational Research*, XIII (March, 1926), p. 158.

[7] It may be noted that this line has an angle about 1½ degrees greater than the educational-age line of McCall.

distributions of mean mental age, mean chronological age and mean educational age per grade would all coincide and would lie in a line having a slope of precisely 45 degrees through the school years. Such a line may be found convenient for reference and is plotted for that purpose in the chart.

At adolescence, as we have shown,[8] the mean mental age seemingly approaches constancy while the mean educational age continues to advance by reason of its response to the effect of training or nurture. At what point the mean educational-age curve begins to be deflected is problematical, but doubtless for each individual there is a period of cessation of acquisitive power, hence a mean period for the whole population, a time when further acquisition of learning is impossible, a "dead line" when the subject is too old to be taught anything either by his peers or his experience. Some reach this stage early, others very late in life. The mean educational-age curve is then deflected like the mean mental-age curve toward the horizontal but at a much higher level. Whether it may actually recede is a question we shall not attempt to discuss.

What form the mean educational-age curve may take through and beyond the adolescent period there appears no practical way of determining by direct observation, chiefly because the higher institutions do not and cannot provide a uniform curriculum adapted to the entire population. If at adolescence mental progress as an expression of physiological growth practically ceases, it seems evident that the educational-age distributions thereafter should reflect only the annual increment of acquired power derived from training. Hence from the mean period of mental adolescence, apparently about the middle of the second high-school year, beginning at the acquired level of mean educational age the distribution of mean educational ages per year should lie on a line whose slope is less than the slope of the pre-adolescent educational-age line by the angle that the pre-adolescent mental-age line makes with the reference line of 45 degrees, that is, $48\frac{3}{4}^\circ - 1^\circ = 47\frac{3}{4}^\circ$. Hence the mean educational-age line distributions per year for the period above the second year high school should lie on a line whose equation is $y = 1.10x + .19$.

All of the age distribution curves here discussed are represented in Chart 1. It seems evident that for the elementary-school period none

[8] Banker, Howard J. "Mental-age Distribution in School Progress," *Journal of Educational Research*, XXIII (April, 1931), pp. 273-279.

of these distributions, if assumed as a basis for an ability index, ought to involve any vital difference in practical results, yet the two successive educational-age lines here developed would appear to have the better theoretical foundation. Hence even for elementary-school life and especially for post-adolescent life, they constitute the most reliable basis obtainable for an SAI applicable to students in higher educational institutions.

From the two equations:

I. $y = 1.14x - .43$ (For grades I to mid-X)

II. $y = 1.10x + .19$ (For grades mid-X and above)

Table I has been computed and the values for mean educational age per grade (y or MEA) substituted for MGA renders the original formula for a student's ability index applicable to all periods of educational life. The formula may then be written:

$$SAI = \frac{Mk}{CA} \times \frac{MEA}{GMk}$$

in which MEA, substituted for MGA, is the mean educational age computed for the given time and grade from one of the above equations. For most purposes this may be read from the table. As a rule GMk may be taken as .85 in a percentile system of marking but in some cases should be determined by a special investigation of the conditions.

TABLE I

MEAN EDUCATIONAL AGE PER FULL YEAR GRADES OF TWO CONSECUTIVE NOT CONTEMPORANEOUS SECTIONS, B AND A, COMPUTED FOR ENTRANCE, MID-SCHOOL YEAR AND END OF SCHOOL YEAR FROM EQUATIONS

I. $y = 1.14x - .43$ (For grades I to mid-X)

II. $y = 1.10x + .19$ (For grades mid-X and above)

Grade	At entrance		At mid-school year		At end of school year	
	x	y MEA	x	y MEA	x	y MEA
I.	6	6.41	6.42	6.89	6.84	7.36
II.	7	7.55	7.42	8.03	7.84	8.51
III.	8	8.69	8.42	9.17	8.84	9.65
IV.	9	9.83	9.42	10.31	9.84	10.79
V.	10	10.97	10.42	11.45	10.84	11.92
VI.	11	12.11	11.42	12.59	11.84	13.07
VII.	12	13.25	12.42	13.73	12.84	14.21
VIII.	13	14.39	13.42	14.87	13.84	15.35
IX.	14	15.53	14.42	16.01	14.84	16.49
X.	15	16.67	15.42	17.15	15.84	17.61
XI.	16	17.79	16.42	18.25	16.84	18.71
XII.	17	18.89	17.42	19.35	17.84	19.81
XIII.	18	19.99	18.42	20.45	18.84	20.91
XIV.	19	21.09	19.42	21.55	19.84	22.01
XV.	20	22.19	20.42	22.65	20.84	23.11
XVI.	21	23.29	21.42	23.75	21.84	24.21
XVII.	22	24.39	22.42	24.85	22.84	25.31
XVIII.	23	25.49	23.42	25.95	23.84	26.41
XIX.	24	26.59	24.42	27.05	24.84	27.51
XX.	25	27.69	25.42	28.15	25.84	28.61

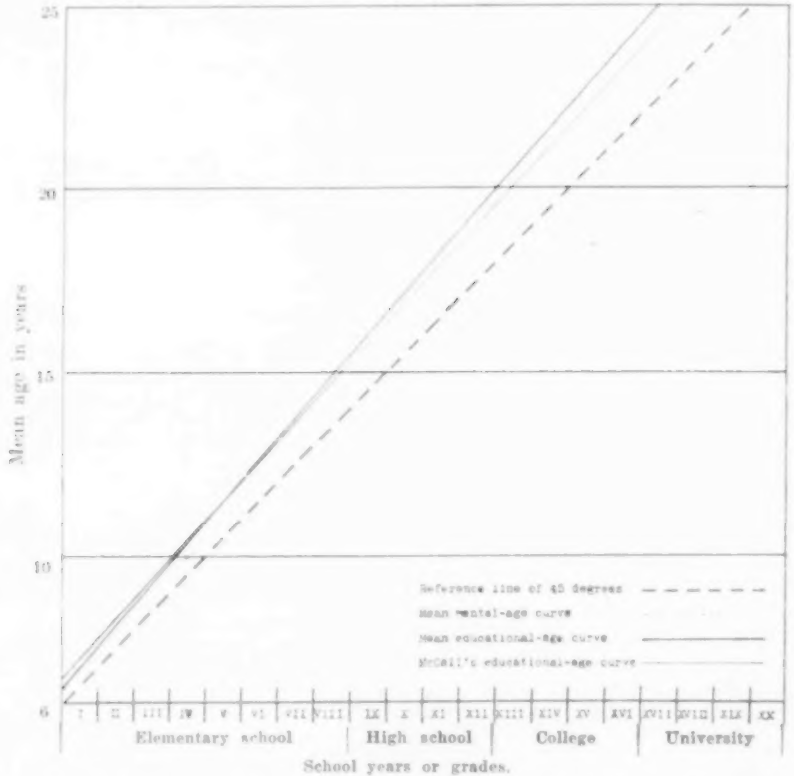

CHART I. SHOWING CURVES OF DISTRIBUTION OF MEAN AGES PER SCHOOL YEAR THROUGH THE STANDARD PERIOD OF SCHOOL LIFE[9]

The origin of coördinates is at birth, the horizontal scale being years of school progress and the vertical scale being years of age; both from the age of six.

As a test for the reliability of the modified formula, the SAI's were computed for the same students as were used in a previous study.[10] In the former work the SAI's were computed from the mean mental age per grade as a basis for the formula, now they were computed from the mean educational age per grade as here developed, in both cases using .85 as the value of GMk. The self-correlations for the same 393 students in the same successive semesters of elementary school work gave an aver-

[9] It is evident from the equations that the educational-age line has a slight bend at about its mid-point but the chart is reproduced on so small a scale that this is not apparent to the eye.

[10] Banker, Howard J. "Correlation Studies of the Student's Ability Index," *Journal of Educational Research*, XX (June, 1929), pp. 31-37.

age coefficient of .9571 for the latter SAI's as against an average coefficient of .9547 for the former, see page 36 of the paper cited. The correlation of the SAI's with the IQ's obtained from an Otis group test gave for the same 331 students in school B an average coefficient per grade of .8260 as against an average coefficient of .8253 in the former work, see page 33 of the paper cited.

It is evident from this that the SAI's obtained by the modified formula are fully as reliable as the SAI's derived from the older formula having a mental-age basis. The differences observed in the coefficients of correlation are too small to have significance and it matters little which formula is used in elementary school grades, but the later formula, based on educational age is more logical if not a shade more accurate and has the decided advantage that it may be employed continuously through and beyond the period of adolescence.

AN EVALUATION OF ABILITY GROUPING

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MORE than ten years ago, ability grouping for the purpose of improving the effectiveness of instruction was instituted experimentally in twenty-three elementary schools in Philadelphia. Assignment of pupils to groups was made mainly on the basis of teacher judgment. At the request of the principals concerned, the practice of grouping was extended to other schools. Consequently in September, 1925, there were forty-two elementary schools in which attempts were made to group pupils homogeneously, at least in some grades.

In January, 1926, a survey of the relative success of pupils in grouped and ungrouped classes indicated the desirability of reducing intensive experimentation to a smaller group of schools in order that the bases for classification into groups, the course adjustments for ability groups, and other factors of the experiment could be satisfactorily controlled, and pupil achievement evaluated in the light of known conditions.

As a result, during the last six years, intensive experimental work has been conducted in five schools only. A number of other schools have ability grouping, but with a flexibility of conditions as determined by the principal of the given school. In the five selected schools certain definite specifications have been developed with a view to controlling the conditions of the experiment. The most important of these are the following:

1. The pupils of a given grade section are divided into groups according to some measure of brightness or estimated rate of progress. In most cases in the five schools a given grade-section has enough pupils for three groups.

2. Classification of pupils into groups in the primary grades is based on comprehensive individual examinations administered by clinical psychologists of the Division of Special Education.

3. Pupils in the intermediate grades are classified according to the results of a group intelligence or classification test which is highly verbal. The Otis Classification Test or the Philadelphia Intelligence Test is used for this purpose.

4. Transfers of pupils from group to group are limited to (1) those cases where definite objective data indicate the desirability of such

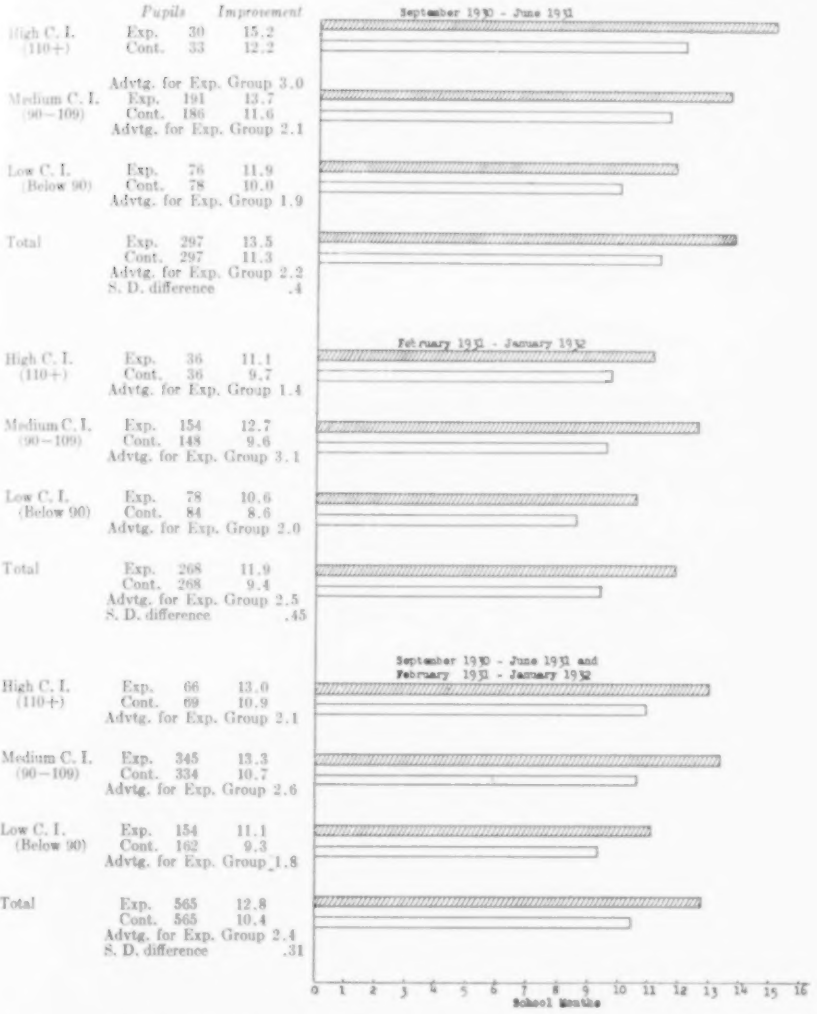
transfer, (2) those cases made necessary by the exigencies of school administration. These latter are reduced to a minimum.

Pupils Improvement
September 1930 - June 1931
High C. I. (110+) Exp. 30 15.2
Cont. 33 12.2
Advtg. for Exp. Group 3.0
Medium C. I. (90–109) Exp. 191 13.7
Cont. 186 11.6
Advtg. for Exp. Group 2.1
Low C. I. (Below 90) Exp. 76 11.9
Cont. 78 10.0
Advtg. for Exp. Group 1.9
Total Exp. 297 13.5
Cont. 297 11.3
Advtg. for Exp. Group 2.2
S. D. difference .4
February 1931 - January 1932
High C. I. (110+) Exp. 36 11.1
Cont. 36 9.7
Advtg. for Exp. Group 1.4
Medium C. I. (90–109) Exp. 154 12.7
Cont. 148 9.6
Advtg. for Exp. Group 3.1
Low C. I. (Below 90) Exp. 78 10.6
Cont. 84 8.6
Advtg. for Exp. Group 2.0
Total Exp. 268 11.9
Cont. 268 9.4
Advtg. for Exp. Group 2.5
S. D. difference .45
September 1930 - June 1931 and February 1931 - January 1932
High C. I. (110+) Exp. 66 13.0
Cont. 69 10.9
Advtg. for Exp. Group 2.1
Medium C. I. (90–109) Exp. 345 13.3
Cont. 334 10.7
Advtg. for Exp. Group 2.6
Low C. I. (Below 90) Exp. 154 11.1
Cont. 162 9.3
Advtg. for Exp. Group 1.8
Total Exp. 565 12.8
Cont. 565 10.4
Advtg. for Exp. Group 2.4
S. D. difference .31
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
School Months

FIGURE I. ABILITY GROUPING EVALUATION—GRADES 4B-5A
Sept. 1930—June 1931 and Feb. 1931—Jan. 1932
Improvement by C. I. Groups—Composite of Five Tests
(Unit of Improvement = 1 month or .1 unit of grade score)

5. An attempt is made to recognize the relative demands for individualization in the various groups by giving to the lowest group, group III, the smallest number of pupils; to group I, the highest group, the next smaller number of pupils; and to group II, the middle group, the largest number of pupils. A ratio of 8-9-7 for groups I, II, and III respectively is approximated.

6. Minimum courses in arithmetic, geography, and history, and suggestions for differences in method for bright and dull groups offer some provision for curriculum adjustment.

7. The results of standardized intelligence and achievement tests are recorded on a cumulative record card which accompanies each pupil as he progresses through the grades.

REQUIREMENTS FOR AN EVALUATION OF GROUPING

An adequate evaluation of ability grouping requires a comparison of the improvement of pupils in homogeneous groups with the improvement of similar pupils in heterogeneous groups. For a control group we should have a heterogeneously classified group which is similar to the experimental group in all significant factors such as grade placement, intellectual brightness, chronological age, initial status in the factors to be improved by the school, and efficiency of teaching. In other words, the control group would differ from the experimental group only in the factor of being grouped according to ability. Furthermore, an adequate evaluation requires that records of improvement be based on individual pupil records rather than group records, in order that the factor of pupil turnover may not vitiate the comparison of initial with final test records.

PLAN OF THE EVALUATION

In accordance with these requirements an evaluation has been made of the improvement, over a period of a year, of two sets of pupils in the five ability grouped schools, those entering grade 4B (second semester of grade four) in September, 1930, and those entering grade 4B in February, 1931. Two or more control schools were chosen for each of the experimental schools, selection being such as to get approximately the same types of environmental conditions in both the experimental group and its control. It was not intended that these schools should for purposes of the evaluation retain their identity but merely that they should yield pupils who could be paired with similar pupils in the experimental group. No school selected as a control had ability grouping. For any

given experimental school, the control schools were chosen so as to get a group of pupils of approximately the same average intelligence, as determined by an inspection of the school median intelligence quotients for grade 6B in April, 1930.

The pupils in the ability grouped schools and their controls were tested at the beginning and at the end of a year, the first set in September, 1930, and June, 1931, and the second set in February, 1931, and January, 1932. Since the policy in Philadelphia is for a teacher to carry the same group through the A and B section of a given grade, this meant that each child during the period of the experiment came under the influence of at least two teachers.

The method of evaluation was exactly duplicated for the two sets, furnishing an empirical measure of the reliability of the results. Both sets of pupils came from the same school organizations and, in general, the same teachers were involved. The repetition of the evaluation was designed to equate out unknown accidental factors which might have affected the achievement of given classes.

All pupils concerned were given the Otis Classification Test at the beginning of the period of evaluation. Equivalent or calibrated forms of the following five standard achievement tests were administered at the beginning and at the end of the year: (1) Philadelphia Test in Problems in Arithmetic, (2) Philadelphia Test in Fundamentals in Arithmetic, (3) Philadelphia English Test, (4) Philadelphia Geography Reading Test, and (5) Stanford Test in Paragraph Reading. All scores were recorded in terms of so-called standard score units, which enable us to make immediate comparisons among subjects and between individual scores in a subject and the norm. The difference between two successive standard scores indicates a difference in achievement equal to that normally achieved in one semester. The normal standard score for the beginning of grade 4B is 9. At the end of the year's evaluation, the normal standard score would therefore be 11. After the administration of each series of achievement tests, each pupil's composite score for the five tests was computed by adding together the five achievement test standard scores. If the resulting composite score had been divided by five, it would have given an average standard score. However, since the difference between two successive standard scores represents normal achievement for a semester of five school months, the composite score gives a result directly interpretable in terms of grade score and in units of school months.

ASSUMPTIONS UNDERLYING THE EVALUATION

There has been much discussion about ability grouping. It has been attacked on philosophical grounds with an implication either that certain skills are not important enough to be developed by the school or that they can be developed better under a system where children are grouped by some other factor than a degree of homogeneity in the skill in question. The Philadelphia study is based on the following theses:

1. There are two kinds of important outcomes of teaching, (a) those which have to do with human purposes, conditioning pupils' personalities, methods of work, adjustment to the world and the like, and (b) those which have to do with basic skills necessary for the furtherance of human purposes.

2. There is available no scientific evidence that one kind of grouping is better than any other for engendering purposeful activity involving a whole class of pupils. It is obvious from life situations, however, that chronological age and intelligence level are two important factors in community of interest.

3. Purposeful activity programs are not inconsistent with the need of practice sufficient to develop basic skills. The practice is better motivated because it is part of a total situation which has made apparent the need of the skill.

4. Those basic skills which are hierarchical in nature can best be developed by proceeding from the relatively more simple to the more complex sub-skills.

5. Ability grouping is an administrative device for reducing the range of pupil skill-proficiencies among a given group to be instructed.

6. Since the way in which children are grouped is only one of a large number of educational factors affecting the child, this one factor, if all the others by some means were held constant, could at best account for but a small amount of the improvement found.

7. A given type of grouping may be considered an effective administrative device if it secures greater improvement in skills than does an alternative device, and if it is not definitely detrimental to the pursuance of purposeful activity and adequate personality development.

Whether or not ability grouping is detrimental to adequate personality development has been discussed widely and with conflicting conclusions. One of the authors has presented some data on this subject in

previous article.[1] On the whole, all the available evidence seems to indicate that success in securing desirable outcomes is itself an outcome of teacher and supervisory attitude in the given situation. The effect of ability grouping upon the development of certain basic skills is reported in this article.

COMPARISON OF CONTROL AND EXPERIMENTAL GROUPS AT THE BEGINNING OF THE EVALUATION PERIOD

Even though the evaluation of ability grouping is based on individual records rather than on group records, it is important to compare initial scores in the two types of school to check the choice of control schools. Table I indicates for the ability grouped and control schools respectively, the average initial score for each of the five achievement tests, the average classification index by the Otis Classification Test, and the average chronological age. The data are shown for the September, 1930-June, 1931 group and for the February, 1931-January, 1932 group. It is apparent that in each of the elements recorded, the total experimental and control groups are fairly well matched at the beginning of the period of evaluation.

STIMULATION OF CONTROL GROUP

In order that the experimental pupils should have no unfair advantage, a cumulative test record card, similar to the one in use in the experimental schools, was used for each child in the control group. All test results were recorded in terms of standard score units, and an "ability correction" was used so that the teacher might diagnose achievement in relation to ability and differentiate instruction accordingly.

COMPARATIVE IMPROVEMENT OF PAIRED PUPILS

The improvement of the ability grouped schools was compared with that of the control schools on the basis of the records of paired pupils in the two types of school. The pairing of pupils was done at the end of the year period after all records were complete. The record of a given pupil in the experimental group was paired with that of a pupil in the corresponding control group who had at the beginning of the experiment approximately the same classification index (generally within five points),

[1] Boyer, Philip A. "The Philadelphia Experiment in Homogeneous Grouping," *Schoolmen's Week Proceedings*, XVII (University of Pennsylvania, 1930), pp. 241-257.

TABLE I

ABILITY GROUPING EVALUATION—GRADES 4B-5A
INITIAL AVERAGES FOR ACHIEVEMENT, CLASSIFICATION INDEX, AND CHRONOLOGICAL AGE

	September 1930		February 1931	
	No. of Cases	Average*	No. of Cases	Average*
ARITHMETIC PROBLEMS				
5 Experimental Schools	488	8.6	558	8.3
16 Control Schools	947	8.8	1167	8.9
ARITHMETIC FUNDAMENTALS				
5 Experimental Schools	472	8.5	530	10.3
16 Control Schools	958	8.9	1122	10.0
PARAGRAPH READING				
5 Experimental Schools	471	8.9	517	9.0
16 Control Schools	973	8.7	1140	8.9
WRITTEN ENGLISH				
5 Experimental Schools	476	9.0	521	10.1
16 Control Schools	922	8.7	1103	9.6
GEOGRAPHY READING				
5 Experimental Schools	473	8.2	531	8.5
16 Control Schools	986	8.2	1117	8.4
OTIS CLASSIFICATION INDEX				
5 Experimental Schools	496	93.9	566	94.6
16 Control Schools	897	92.4	1119	93.5
CHRONOLOGICAL AGE				
5 Experimental Schools	496	10–3	566	10–1
16 Control Schools	897	10–5	1119	10–4

* Median standard score in case of each achievement test and mean in case of classification index and chronological age.

approximately the same chronological age (generally within six months) and approximately the same initial composite achievement test score (generally within five points). This procedure yielded a total of 297 pairs of pupils in the September, 1930-June, 1931 set whose average C.I., C.A., and initial composite test scores were, for the purposes of the experiment, identical and similarly a total of 268 pairs for the February, 1931-January, 1932 group.

A total of 1130 pupils entered into the evaluation out of approximately 3000 tested at the beginning of the experimental period. This depletion is due to pupil-turnover, incomplete records, and lack of suitable records for pairing. It is assumed that these factors affected pupils in both experimental and control groups similarly. Thus the experimental pupils to be paired are presumably as representative of the total experimental group of pupils as the corresponding control pupils to be paired are representative of the total control group.

The improvement in composite score is presented in Figure I for high, medium, and low Classification Index groups, for each year's evaluation separately and for the total evaluation. The unit in which improvement is expressed is equal to the achievement normally secured in one school month. An improvement of ten points indicates a growth in achievement normally secured in one school year. Within the period of

School	No. of Pupils	Av.C.I.	Av.C.A.	Average Initial Composite Score	Average Final Composite Score	Improvement
Exp. School A	152	98.6	9-10	47.8	63.2	15.4
Cont. School A	152	98.4	9-10	48.2	57.3	9.1
Advantage for Experimental School						+6.3
Exp. School B	98	94.4	9-10	42.8	53.9	11.1
Cont. School B	98	94.4	9-11	42.8	55.9	13.1
Advantage for Experimental School						−2.0
Exp. School C	62	92.7	9-9	37.8	50.7	12.9
Cont. School C	62	92.5	9-9	38.7	49.5	10.8
Advantage for Experimental School						+2.1
Exp. School D	136	100.9	10-0	49.4	60.1	10.7
Cont. School D	136	100.6	10-0	49.4	60.0	10.6
Advantage for Experimental School						+0.1
Exp. School E	117	93.2	10-3	46.8	59.7	12.9
Cont. School E	117	92.8	10-3	46.7	56.2	9.5
Advantage for Experimental School						+3.4
Total Exp.	565	96.5	10-0	46.0	58.8	12.8
Total Cont.	565	96.4	10-0	46.2	56.6	10.4
Advantage for Experimental Schools						+2.4

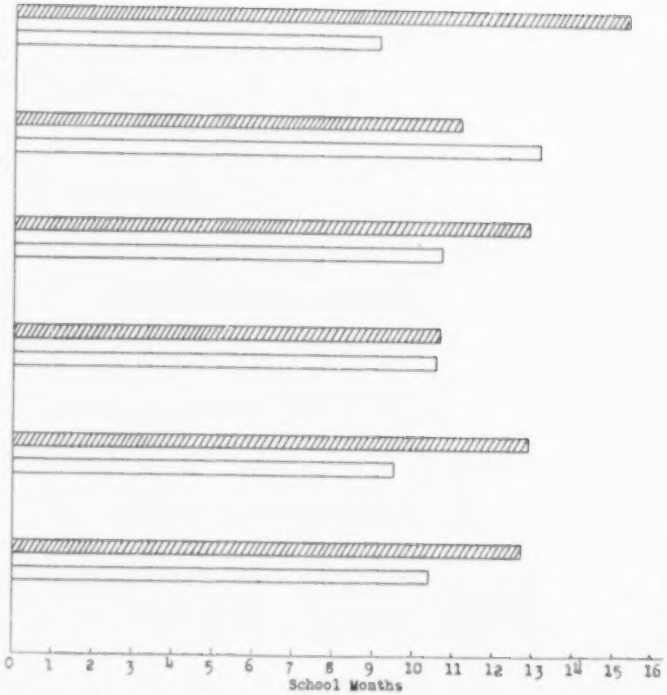


FIGURE II.—ABILITY GROUPING EVALUATION—GRADES 4B-5A
Sept. 1930—June 1931 and Feb. 1931—Jan. 1932
Improvement by Schools in Composite Test Scores
(Unit of Score = 1 month or .1 unit of grade score)

this experiment, ten points of improvement would represent normal achievement. The total 565 experimental pupils made an improvement of 12.8 points. The corresponding control pupils made an improvement of 10.4 points. Thus there was an advantage of 2.4 months for the experimental group, with a standard error of .31, indicating statistical significance for the difference.

The results for each of the two separate evaluations are in agreement. The September, 1930-June, 1931 group of 297 experimental pupils made an improvement of 13.5 points as compared with an improvement of 11.3 points for their control, an advantage of 2.2 for the experimental group, with a standard error of .43. The February, 1931-January, 1932 experimental group of 268 pupils showed an improvement of 11.9 points as compared with 9.4 for their controls, a superiority of gain amounting to 2.5 points over their control, with a standard error of .45. Neither experimental or control pupils in the February, 1931-January, 1932 group made so much improvement as the September, 1930-June, 1931 group, although the superiority of experimental pupils to control pupils was about the same.

When the improvement is examined by classification index groups, it is seen that for both the September, 1930-June, 1931 set and the February, 1931-January, 1932 set the experimental pupils in high, medium, and low C.I. groups show superior improvement to their control pupils in the corresponding groups.

For the entire 565 pairs, there is for the experimental group an advantage in improvement of 2.1 for the high C.I.'s (110+) a superiority of 2.6 for the medium C.I.'s (90-109) and a superiority of 1.8 for the low C.I.'s (below 90). Among the experimental pupils alone, the medium C.I.'s made the most improvement (13.3) the high C.I.'s made almost as large an improvement (13.0) and the low C.I.'s made the least improvement (11.1). Among the control pupils alone, the high C.I.'s made the most improvement (10.9) the medium C.I.'s made the next largest improvement (10.7) and the low C.I.'s made the least improvement (9.3). The bar graphs show these comparisons.

In the September, 1930-June, 1931 set in both experimental and control groups the high C.I.'s improved more than the medium C.I.'s and the medium C.I.'s improved more than the low C.I.'s. In the February, 1931-January, 1932 set, for the control pupils, again in order of improvement we have high C.I.'s, medium C.I.'s, and low C.I.'s, although the lead of

the high C.I.'s is exceedingly slight. For the experimental group, however, the improvement of the medium group has outstripped the improvement of the high group, as well as that of the low group.

The results are also presented for the 565 pairs by schools (Figure II). Of the five schools, three show considerably more improvement than their controls (Schools A, C, and E with advantages of 6.3, 2.1, and 3.4 respectively), one shows about the same improvement (School D, advantage of .1) and one shows less improvement (School B, an advantage of 2.0 for the control). In Figure II are also presented the average C.I., average C. A. and average initial composite test score for experimental and control pupils by schools, in order to show the accuracy of the pairing.

Analysis of the results by the two periods of evaluation show that schools A, C, and E showed superior gains in both experiments. B was inferior both times, and D was inferior the first time and superior the second.

TEACHER EFFICIENCY

Teacher efficiency was not a factor in the superior improvement shown by the ability grouped pupils. The average efficiency percentile rank for the teachers of the experimental group was forty-four and for the teachers of the control group, forty-two. Thus, though teachers of both groups were slightly below the city median in efficiency, they were closely similar in the two groups.

CONCLUSION

The Philadelphia evaluation of ability grouping indicates that, as concerns the improvement of arithmetic, reading, and technical English skills, there is a statistically significant difference in favor of homogeneously grouped pupils as compared with heterogeneously grouped pupils.

Since ability grouping is only one of many factors which facilitate improvement, a very small amount of superiority may be very significant.

The superiority evidences itself not only in the complete group, but separately in each of the several C.I. groups, high, medium and low, and in four of the five experimental schools in either the first or second experiment and in three schools in both studies.

It is possible, though not probable, that the superiority may be due to greater professional stimulation of the experimental schools. However, ability grouping is not new in these schools. Its stimulating effect had

been at work for a considerable period of time before the initial testing of the pupils concerned in these studies and would therefore affect initial as well as final scores.

It may be that the final question of "to group homogeneously or not so to group" cannot be answered by statistical analysis. The few variables which are objectively measurable are closely associated with other factors for which no satisfactory measurement exists. Consequently it is difficult to apply strictly the law of the single variable either in the manipulation of the experimental situation or the statistical analysis of the results. However, the results of the present study offer exceedingly strong evidence that homogeneous grouping *can* be a factor in securing improvement in certain important skill subjects.

RELIABILITY OF STANFORD-BINET INTELLIGENCE QUOTIENTS DERIVED BY STUDENT EXAMINERS

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THE purposes of this paper are to determine: (1) the reliability of the Stanford-Binet Intelligence Test as administered by normal school students in training; (2) the relative reliability of the Stanford-Binet Test as administered to different specified age levels by student examiners; (3) the relation between the reliability of the Stanford-Binet Test and the time interval between tests as administered by students in training; and (4) the relation between the reliability of the Stanford-Binet Test and the size of I.Q. at the time of the first testing.

The writer is not primarily concerned with determining the reliability in general of the Stanford-Revision of the Binet. This objective has been accomplished by many studies as represented by Kelley,[1] Dickson,[2] Lincoln,[3] and Randall.[4] The range of reliabilities as reported in these references is from .72 to .95 with a mean of .88.

During the past five years, small selected groups of second and third-year students at the Washington State Normal School at Ellensburg have been trained in the administering of the Stanford Revision of the Binet Intelligence Scale. One thousand and seventy-seven tests have been given under the supervision of the writer to elementary school children. Of these, 201 have been retests. The data are obtained from the records of ten classes, ranging from six to fourteen students each, including a total of 94 examiners, 76 of whom participated in retests. In no case reported was the second test administered by the examiner who gave the first test. Most of the examiners had successfully completed a course in teaching methods and supervised teaching. Thus most of them had had experience in dealing with children. The details regarding the time intervals between tests, the chronological age groupings of the children tested and size of initial I.Q. are given in the tables.

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[1] Kelley, T. L. *Interpretation of Educational Measurements.* (New York: World Book Company, 1927), p. 294.

[2] Dickson, V. E. *Mental Tests and the Classroom Teacher.* (New York: World Book Company, 1923), p. 66.

[3] Lincoln, E. A. "The Reliability of the Stanford-Binet Scale and the Constancy of Intelligence Quotients," *Journal of Educational Psychology,* XVIII (1927), pp. 621-626.

[4] Randall, F. B. "Study on the Constancy of the I.Q.," *School and Society,* XXVI (1927), pp. 311-312.

The classes met twice a week for a twelve-weeks quarter, or four times a week for a six-weeks period. The first four or five meetings were devoted to the history and underlying principles of the Stanford-Binet Tests. During this period, the students were required to familiarize themselves with Terman's *Measurement of Intelligence*, and to provide themselves with the necessary equipment. At least two demonstration tests were administered before the class by the instructor. These were thoroughly discussed afterward by the class, including the details of giving and scoring. A class period was next devoted to detailed positive and negative instructions for administering the tests. In most cases, the schedule permitting, the first tests given by the students were conducted in the presence of the instructor, the test being followed by a conference in which the procedure was criticised minutely. From this time on, the class periods were devoted to detailed discussion of the problems arising in giving and scoring the tests, each student bringing up his own specific problems. Each record booklet was thoroughly checked by the instructor personally, before being approved. All booklets needing revision were returned for correction. Each examiner tested from ten to fifteen children, depending upon the number of children and amount of time available.

TABLE I

PERCENTAGE DISTRIBUTIONS OF 1077 STANFORD-BINET INTELLIGENCE QUOTIENTS ADMINISTERED BY STUDENTS IN TRAINING

I.Q.	Number	Percent
155-146	16	1.5
145-136	19	1.8
135-126	58	5.4
125-116	135	12.5
115-106	241	22.4
105-96	263	24.5
95-86	200	18.6
85-76	100	9.3
75-66	37	3.4
65-56	8	.7
	Total 1077	Mean 103.3

Table I shows the frequency and percentage distributions of the intelligence quotients from the 1077 tests given by examiners in training. It will be noted that the distribution is slightly skewed toward the upper end. The distribution is quite similar, however, to one reported by Terman for 905 cases. The remainder of the study will treat of the 201 cases who were retested.

The correlation between the I.Q.'s of the first and second testing for the 201 retests is .84 ± .014, using the Pearson product moment method.

This is slightly less than the reliability value, namely .88, which is the average of the results reported in the studies referred to above. Therefore the consistency of the I.Q.'s as obtained by student examiners compares fairly favorably with the findings as reported in the literature on the subject.

TABLE II

RANGE AND FREQUENCY DISTRIBUTION OF DIFFERENCES IN I.Q. BETWEEN FIRST AND SECOND STANFORD-BINET TESTS FOR 201 CHILDREN

Change (Gain or Loss) in I.Q.	f	Change (Gain or Loss) in I.Q.	f	Change (Gain or Loss) in I.Q.	f
27	1	6	8	−8	3
25	1	5	9	−9	4
19	2	4	8	−10	8
17	1	3	7	−12	8
16	1	2	8	−13	1
15	2	1	10	−15	3
14	4	0	13	−16	2
13	1	−1	9	−17	1
12	2	−2	10	−19	1
11	5	−3	11	−20	1
10	5	−4	6	−21	1
9	5	−5	8	−24	1
8	6	−6	7		
7	7	−7	10		

N = 201
Mean change in I.Q. = 6.6
Mean algebraic change in I.Q. = .00
σ_d = 5.26
$\sigma_{1\cdot\infty}$ = 3.71

Table II reveals the changes in I.Q. which obtained between the two tests administered to the whole group of 201 children who were retested. Four cases, or about 2 percent, change by more than 20 points. About 81 percent of the cases change 10 I.Q. points or less. The mean change in score, disregarding direction of score, is 6.6 I.Q. points. For the entire group the gains in I.Q. just balance the losses, or in other words, the mean algebraic change in I.Q. is zero.

The symbol σ_d is the standard deviation of the differences found between the I.Q's of the first test and those of the retest regardless of the direction of the change. In other words, it is the standard error of discrepancies between the I.Q.'s as obtained from the two testings. The symbol $\sigma_{1\cdot\infty}$ is the standard error of the estimated differences between the I.Q.'s obtained from the first testing and those which may be designated as "true scores," namely, the average of an infinite number of applications of the test. It is to be noted particularly that the above measures refer to differences in I.Q. regardless of direction of change. There is one chance in six that a change of 3.71 I.Q. units may occur in one direction in a retest, or one chance in three that a change of 3.71 may occur in either direction.

TABLE III

RELATION BETWEEN CONSISTENCY OF I.Q. AND TIME INTERVENING BETWEEN TESTS

Gains and Losses in I.Q. Points	0–6 months between tests	7–12 months between tests	13–24 months between tests	Over 24 months between tests
27				1
25				1
19	1		1	
17	1			
16			1	
15			2	
14	2	2		
13			1	
12		1		1
11	1		1	3
10	1	3	2	
9	2	1		2
8	2	2	1	1
7	1	2	3	1
6	1		6	1
5	2	2	2	3
4			4	4
3	1	2	2	2
2		2	3	3
1	2	2	4	2
0	1	1	8	3
−1		5	4	
−2	1	5	1	3
−3		2	2	7
−4	2	2	1	1
−5	1	1	4	2
−6		2	2	3
−7	1	2	4	3
−8	1		2	
−9	1	1		2
−10	1	1	3	3
−12	1		3	4
−13		1		1
−15			1	2
−16				1
−17				1
−19				1
−20		1		
−21				1
−24				1
N	27	42	68	64
Mean change in I.Q. =	−7.9	5.3	5.7	7.8
Mean algebraic change in I.Q. =	+3.2	+ .2	+ .6	−2.1
σ_d =	4.71	4.64	4.58	6.22
σ_{1-2} =	3.3	3.28	3.24	4.40

Table III gives a comparison of changes in I.Q. as related to the length of time interval between tests. The statistical measures are similar to those used in Table II. Apparently, increases in I.Q. are most likely to occur when the time interval between tests is less than 6 months, with a tendency toward decrease in I.Q. when the interval is over 24 months. The two middle intervals, covering 7 to 24 months inclusive, show the smallest changes.

TABLE IV

RELATION BETWEEN CONSISTENCY OF I.Q. AND AGE OF CHILDREN AT TIME OF FIRST TEST

Gains and Losses in I.Q. points	Under 6–0	6–0 to 7–11	8–0 to 9–11	10–0 and over
27	1			
25	1			
19		2		
17		1		
16	1			
15	2			
14		4		
13	1			
12		1		1
11	2	2		1
10		2	2	1
9	1	3	1	
8	1	4		1
7	4	2	1	
6	1	5	1	1
5	6	2	1	
4	5	3		
3	4	2		1
2	3	2	2	1
1	2	5		3
0	6	5		2
−1	2	4	3	
−2	3	5	2	
−3	3	6	2	
−4	2	3	1	
−5	2	3	1	2
−6	3	3		1
−7	3	4	1	2
−8		3		
−9	2		1	1
−10	3	2	1	2
−12	5	2		1
−13	1			
−15	2	1		
−16	2			
−17		1		
−19	1			
−20		1		
−21	1			
−24	1			
	N 77	N 83	N 20	N 21
Mean change in I.Q. =	7.5	6.4	5.0	6.0
Mean algebraic change in I.Q. =	— .9	+ 1.0	+ .2	— .8
σ_d =	6.14	5.03	3.23	3.99
$\sigma_{1.0}$ =	4.34	3.56	2.28	2.82

Table IV indicates that changes are apt to be larger for children under 6 years at the time of the first testing than for older children. The populations between 8-0 and the upper age limit are not large enough to yield very reliable results.

TABLE V

RELATION BETWEEN CONSISTENCY OF I.Q. AND SIZE OF I.Q. AT TIME OF FIRST TEST

Gains and Losses in I.Q. points	Above 125	125–111	110–91	90–76	Below 76
27			1		
25			1		
19				2	
17				1	
16			1		
15			2		
14		3		1	
13			1		
12					2
11			3	1	1
10			3	1	1
9		1	3	1	
8		2	2	2	
7			5	1	1
6		1	5	1	1
5		3	3	3	
4		2	5	1	
3		3	3	1	
2			5	1	2
1	1	3	2		5
0		4	7	2	
—1		2	4	3	
—2	1	5	3	1	
—3		1	6	4	
—4		3	3		
—5		3	2	3	
—6			7		
—7	1		7	2	
—8			3		
—9			3	2	
—10	1	3	2	1	
—12	1	3	4		
—13		1			
—15			3		
—16	1		1		
—17			1		
—19			1		
—20			1		
—21	1				
—24			1		
	N 7	N 42	N 104	N 35	N 13
Mean change in I.Q. =	9.9	5.4	7.1	6.5	5.2
Mean algebraic change in I.Q. =	—9.6	— .4	— .6	+2.2	+5.2
σ_d =		4.30	5.52	4.92	
σ_{1-2} =		3.04	3.90	3.48	

According to Table V, the children who are high in the first test tend to earn lower I.Q.'s in the second test. Those who are low on the first test tend to secure higher I.Q.'s on the second. This is especially striking for those who are below I.Q. 76 on the first test, and is found to a less degree in the 90-76 group. The range of change for the middle group is notably greater than for the other groups. The groups above 125 and below 76 are so small that it seemed unwise to compute values for σ_d and σ_{1-2}.

CONCLUSIONS

1. Apparently, normal school students can, under the conditions stated in this study, administer Stanford-Binet Tests yielding results which are almost as reliable as those produced by experienced examiners.
2. There is evidence that retests within 6 months, or after more than 24 months, give less consistent results than those administered within 7-24 months.
3. Apparently, retests administered to children who are under 6-0 years at the time of the first test are less consistent than is the case with older children. To a less degree this seems to be true for children between 6-0 and 7-11 years at the time of the first test.
4. There is a tendency for those obtaining extremely low or extremely high I.Q.'s on the first testing to be nearer average on the second testing.
5. It is possible that the variations noted in amount of change of I.Q. for different intervals between tests, varying age of child at time of first test and for differences in initial I.Q. are partially influenced by variations in proportionate difficulty at various levels of the Stanford Revision of the Binet Test.

EDITORIALS

CAUTIONS TO THE BEGINNER IN EDUCATIONAL RESEARCH

A too common attitude on the part of educational workers about to engage in their first research project, whether in the field or the graduate school, is that most of the problems of education have been solved. This impression is due in part to the completion of approximately 2600 graduate theses in education each year and to the appearance annually of some six hundred books, monographs, and bulletins, to say nothing of other types of educational literature, including periodicals. Of course the experienced research worker recognizes the incompleteness of many of these studies and the multitude of unsolved problems involved in the training of youth with a host of variable factors. The experienced research worker may be compared with the Indian or woodsman who recognizes the significance of a faint haze on the distant horizon and of the broken twig or disturbed fallen leaf. The eye of the novice or city dweller may be physically just as keen as that of the trapper, but he fails because of limited experience to recognize the meanings involved.

It should not be difficult in education, an applied science, for student or teacher to find in his own field of work a number of practical problems of interest. In fact, the story of *The Great Stone Face* has a direct application in the case of field workers or students who look everywhere except in their own "back yards" for pressing problems of immediate interest. No doubt in many instances the administrator and teacher are so close to their work and so occupied with a multitude of details as to overlook large problems relating to organization, administration, curriculum, procedure, or measurement, in other words attention directed to numerous trees prevents seeing the forest as a whole.

Those who actually select problems for study may err in either of two extremes in delimiting the scope of the investigation. Students sometimes state that they wish to attack the problem of "school administration" or of "science teaching," failing to realize that a field of many issues is involved rather than a single problem. Others attack such narrow and isolated problems that it is difficult to relate the conclusions reached to the general scheme of education. Possibly certain of the experiments dealing with memorization of nonsense syllables, maze-learning, ball-tossing, and target-shooting belong to this group.

In addition to field contacts which reveal teaching, supervisory and administrative problems in need of investigation, current educational literature is a valuable source of information. The types of available

analyses considered most helpful in locating problems or in determining whether the solution of a given difficulty already is in print include: (1) frequency distributions of the research completed in various fields; (2) authoritative statements of accomplishment and research completed; (3) analyses of educational trends; (4) critiques; (5) educational prophecies; (6) surveys of research under way; and (7) statements of needed research. The preliminary bibliographical survey of previous studies relating to the problem investigated may accomplish three purposes: (1) show whether the evidence available solves the problem without further investigation; (2) provide ideas, theories, hypotheses, or explanations valuable in formulating the problem; and (3) provide information concerning the methods of research most appropriate for solving the given problem. The major sources of information in terms of the type of thinking involved are: (1) factual or experimental studies; (2) theoretical, speculative, or philosophical discussions; and (3) historical treatises.

Only through painstaking analysis of the available educational literature is the research worker able to determine whether his chosen problem has been previously investigated. If this preliminary step is neglected, he may be attacking a problem which has been satisfactorily worked out. A university teacher of Italian, a Ph.D. candidate, had worked for a year on the contribution of a certain Italian author to the literature of his time. Imagine the disappointment and chagrin of the teacher to find accidentally on the library shelves two dust-covered volumes on the same subject, written by a scholar in a much more thoroughgoing fashion than he could hope to achieve. Undoubtedly the preliminary canvass of the field had been far from complete.

Full-time students and teachers-in-service registered in university classes sometimes propose as subjects for term papers and even for theses the preparation of comprehensive summaries of factual studies in such fields as reading and arithmetic, seemingly unaware of the excellent work of Gray and Buswell respectively and of the annual supplements in the *Elementary School Journal*. It happens occasionally that two workers, each without knowledge of the other, conduct similar studies simultaneously, and make almost identical results public at about the same time. Without question both make an important joint contribution to knowledge, for example, the James-Lange theory of the emotions, the Lancaster-Bell system of monitorial instruction, the contribution of the Wright brothers and Langley to heavier-than-air flying, and the discovery of anesthetics. Sometimes the beginner in educational research mistakenly assumes that because a problem has been studied under one set of conditions, the issue is settled for all other circumstances. A high-school principal in West Virginia was studying as a Master's problem the all-year school for mining communities. He became discouraged without cause about his problem on finding that the all-year school had been studied in connection with a single school in metropolitan New

York City. For that matter, in certain instances, studies need to be repeated under identical conditions in order to secure an adequate check on the results of the first investigation.

Having defined and delimited the problem accurately, the research worker must choose one or more techniques for use in collecting the necessary data. Such scientific techniques were discussed in a recent editorial.[1]

Many errors are made in the interpretation of data. A common mistake for inexperienced investigators, in the case of two or more attendant circumstances or results, is to interpret one factor as causal, overlooking some common factor with a causal relationship to the several results involved. For example, it was found that the greater the amount of Latin taken in high school the better the college marks of the students involved. This fact was used as a basis for a recommendation that one should take high-school Latin in order to succeed in college, overlooking the causal factor of intelligence which operated both in the election of Latin and in college performance. An investigation of the composition of high-school boards revealed that urban high schools ranked high with accrediting organizations and had boards made up in most instances of professional men, while rural schools ranked lower in terms of accrediting ratings and had boards composed of farmers. The interpretation was that improvement of standards in rural high schools could be brought about by placing professional men on the boards, overlooking the economic and social status of the community as a causal factor in determining both school standards and the composition of the population and board. A study of one hundred eminent negroes revealed that most of them had attended segregated negro elementary schools, and reached the conclusion that such training was a factor in producing eminence, overlooking the fact that most of these mature individuals attended elementary school in the South, with only a few cases attending school in other parts of the country, during the latter part of the nineteenth century when segregated schools were the rule for all.

The suggestions made in this editorial are rather elementary, while the illustrations used are homely. In fact, the cautions voiced are only a matter of sound common sense. In view of the fact, however, that common sense is not yet a universal attribute of workers in any field, education included, it is expected that the discussion will have some significance for some beginners in educational investigation, whether in the field or graduate school.

CARTER V. GOOD.

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[1] Barr, A. S. "The Integration of Scientific Techniques in Educational Research," *Journal of Educational Research*, XXVI (November, 1932), pp. 219-221.

RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to Editor A. S. Barr, University of Wisconsin, Madison, Wisconsin.

BULLETINS

BAKER, HARRY J., AND OTHERS. "Tests of Intelligence and Aptitude," *Review of Educational Research*, II (October, 1932), pp. 271-342.

Contains the following summaries: general intelligence and its measurements; special abilities and disabilities; the nature and extent of individual mental differences; the construction and statistical interpretation of psychological tests; the general uses of psychological tests; the uses of psychological tests for atypical groups; and vocational aptitude tests and their application. Bibliography.

BROWNE, G. S. *The Case for Curriculum Revision*, Educational Research Series, No. 8 (Melbourne, Australia: Melbourne University Press, 1932), 183 pp.

Contains chapters on: world-wide recognition of the importance of curriculum revision; relation of curriculum revision to successful educational administration; the curriculum and reality; a psychological basis for curriculum revision; a suggested plan of curriculum revision for Victoria; probable outcomes of curriculum revision; construction and use of curriculum tests; examples of activity programmes in Victoria and elsewhere; specimen courses to illustrate procedure in curriculum revision; and difficulties to be overcome.

CALDWELL, OTIS W., AND LUNDEEN, GERHARD E. *An Experimental Study of Superstitions and Other Unfounded Beliefs as Related to Certain Units of General Science.* (New York City: Bureau of Publications, Teachers College, 1932), 138 pp.

An experimental investigation in which the authors studied the effects of specific instruction regarding attitudes toward certain unfounded beliefs. There is a statement of the problem, subject matter of the teaching units, experimental set-up, results, and summary and conclusions.

CARR, WILLIAM G., AND OTHERS. "Facts on School Costs," *Research Bulletin* of the National Education Association, X, No. 5 (November, 1932), 23 pp.

Contains data on the national income and the public school expenditures, national wealth and the value of public school property, national income and government cost, school cost and other governmental costs, school costs and certain other expenditures, recent trends in school costs, and summary.

CRESSMAN, GEORGE RIGHTER. *Local Units for Educational Administration:* Studies in Selected Counties in Pennsylvania and Maryland. Doctor's thesis in Education (Philadelphia: University of Pennsylvania, 1932), 266 pp.

The author discusses the financial status, expenditures, administrative and supervisory control, taxation and assessment, and other factual data related to the form of administrative organization in Pennsylvania and Maryland. Bibliography.

HALES, NORA M. *An Advanced Test of General Intelligence.* Educational Research Series, No. 11 (Melbourne, Australia: University Press, 1932), 60 pp.

A report on the revision, extension, and standardization of the American Army Examination Alpha for use in the Australian schools.

HARRIS, DANIEL. *The Relation to College Grades of Some Factors other than Intelligence.* Archives of Psychology (New York City: Columbia University, 1931), 55 pp.

Following a summary of previous investigations, the author presents data on the relationship between college grades and such factors as, personality, attitudes, health, outside work, age, interests, recreation, extra-curricular activities, etc., for the 800 members of the entering class of the City College, New York, in February, 1929. Bibliography.

HARVESON, MAE ELIZABETH. *Catharine Esther Beecher, Pioneer Educator.* Doctor's thesis in Education (Philadelphia: University of Pennsylvania, 1932), 295 pp.

A historical study of Catherine Beecher a pioneer in the movement for educational equality. Bibliography.

KELLY, FRED J., AND OTHERS. *Research in Higher Education,* Bulletin 1931, No. 12 (Washington: United States Department of Interior, 1932), 133 pp.

Contains papers prepared for the First Regional Conference on Higher Education held under the joint auspices of the United States Office of Education and the University of Oregon at Eugene, Oregon, April 14, 15, and 16, 1931.

MALLER, J. B. *Character and Personality Tests.* (New York City: Bureau of Publications, Teachers College, Columbia University, 1932), 53 pp.

A descriptive bibliography of some 300 tests of character and personality with notes on a number of tests developed in England, Germany, France, and Russia.

MATTHEWS, RODERIC DONALD. *Post-Primary Education in England:* A Study of the Relation of the Board of Education to the Provision for Post-Primary Education in England, 1902-1929. Doctor's thesis in Education (Philadelphia: University of Pennsylvania, 1932), 235 pp.

This study is one of several in preparation by the joint committee for the comparative study of secondary education in England and the United States. The study presents data pertaining to the relation of the board of education to the provision for post-primary education in England, 1902 to 1929, as revealed by the publications of the board.

WRIGHT, EDITH A. *Bibliography of Research Studies in Education 1929-1930.* Bulletin, No. 13 (Washington: United States Department of Interior, 1931), 475 pp.

An annotated bibliography, comprising the fourth annual consultation of research studies in education, comprising masters' and doctors' theses and other investigations completed from July, 1929, to September, 1930.

WYNDHAM, H. S. *Class Grouping in the Primary School*, Educational Research Series, No. 9 (Melbourne, Australia: Melbourne University Press, 1932), 138 pp.

Contains a statement of stated policies of principals and inspectors; analysis of actual conditions in sample schools; the effectiveness of modes of class grouping; and recommendations.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

COREY, STEPHEN M. "The Present State of Ignorance about Factors Effecting Teacher Success," *Educational Administration and Supervision*, XVIII (October, 1932), pp. 481-490.

The author presents a discussion of previous investigations in this field, showing how little we know about the measurement of teaching ability. The validation of instruments for the measurement of teaching ability opens a wide field for research.

DEVRICKS, ROBERT K. "Follow Up Study of Indiana State Teachers College Graduates for 1931," *Teachers College Journal*, IV (November, 1932), pp. 193-202.

A study of 573 graduates: subjects teaching, subject combination; kinds of school in which Indiana State Teachers College graduates are employed, etc.

GATTO, FRANK M. "Promotional Practices and Marking in the Pittsburgh Elementary School," *Pittsburgh Schools*, VII (September-October, 1932), pp. 3-88.

Contains data on the following topics: (1) non-promotion in the first grade; (2) non-promotion in grades two to eight; (3) promotional procedures in the Pittsburgh elementary schools; (4) marking in the Pittsburgh elementary schools; and (5) review of the literature on school marks.

JOHNSON, PALMER O., AND UMSTATTD, J. G. "Classroom Difficulties of Beginning Teachers," *School Review*, XL (November, 1932), pp. 682-686.

A summary of the difficulties of beginning teachers, reported by 372 superintendents in Minnesota.

NILSON, KENNETH. "An Age-Grade Study of Physically Disabled Pupils in Minnesota Public Schools," *Elementary School Journal*, XXXIII (October, 1932), pp. 122-129.

From a study of 1507 disabled pupils, the author concludes that over-ageness is a fact which stands out with fair distinctness, particularly in the elementary school.

SCATES, DOUGLAS E. "Training for Research in the Light of Field Requirements," *Elementary School Journal*, XXXIII (October, 1932), pp. 96-105.

The author enumerates four types of service frequently rendered by "research bureaus" that are not research, after which he defines and illustrates his own concept of research. In the discussion of training, the author suggests: (1) that the training should not be chiefly technical; (2) that a sufficient grasp of the principles of education be given to workers to guide them in their work; and (3) that workers be trained in the practical problems of administering research.

WIGGINS, D. M. "Junior High Schools of Texas," *School Review*, XL (November, 1932), pp. 687-692.

A survey of certain facts such as type

of organization, enrollment, class length, etc., concerning junior high schools in Texas.

THE PSYCHOLOGY OF LEARNING AND TEACHING

BILLET, ROY O. "Plans Characterized by the Unit Assignment," *School Review*, XL (November, 1932), pp. 653-668.

A summary of certain materials appearing in the National Survey of Secondary Education with particular reference to the unit assignment.

BROWN, FRANCIS J. "Knowledge of Results as an Incentive in School Room Practice," *Journal of Educational Psychology*, XXIII (October, 1932), pp. 532-552.

After presenting a critical review of previous investigations, the author presents the results from an experimental study of 138 elementary and junior high-school pupils from which he concludes that a knowledge of test results increases the quality of the performance.

CLARK, CLARENCE C. "Sound Motion Pictures as an Aid in Classroom Teaching," *School Review*, XL (November, 1932), pp. 669-681.

An experimental study on the junior college level in which sound pictures, silent pictures, and lecture-demonstration showed no marked superiority, one over the other, in science instruction.

GRANT, MARION E. "Some Theories and Experiments in the Field of Memory," *Journal of Educational Psychology*, XXIII (October, 1932), pp. 511-527.

The author presents five theories of learning and forgetting; a summary of previous investigations; and the results of an experimental study of the relation between intelligence and retention from which he concluded that the retention is positive and substantial.

GROSSNICKLE, FOSTER E. "Practice Material in the Estimation of the Quotient in Long Division Found in Current Textbooks," *Elementary School Journal*, XXXIII (October, 1932), pp. 130-141.

From a statistical analysis of nine textbooks in arithmetic the author found marked disagreement as to the proper procedure to be employed for estimating the quotient in long division. Three methods are generally employed: (1) the apparent method; (2) the increase-by-one method; and (3) the irregular method.

ST. JOHN, CHARLES W. "Some Evidences of Effects of the Pupil's Classroom Adjustment upon His Achievement Test Performance," *Journal of Educational Psychology*, XXIII (October, 1932), pp. 489-504.

From a study of 503 boys and 455 girls the author concludes that there is evidence to strongly suggest that scores of Achievement Tests are significantly affected by the degree of adjustment or maladjustment of pupils to their teachers and general classroom situation.

CURRICULUM CONSTRUCTION

DIEHL, FRED W. "A Study of the Objectives and Materials of Elementary History," *The Bucknell Journal of Education*, VII (October, 1932), pp. 1-7.

Excerpts from various statements of the objectives of history made during the twenty year period prior to 1932, with a

brief comparison of the content of twelve texts published prior to 1922 and five recent texts.

PHILLIPS, EVELYN BUTLER. "An Analysis of the Curricula of the Small High Schools of Maine," *University of Maine Studies*, Second Series, No. 23 (Orono, Maine, 1932), 86 pp.

Contains a discussion of the types of curricula offered, subjects offered, year in which subjects are offered, required subjects, electives, graduation requirements, college entrance requirements, and recommendations. Bibliography.

MEASUREMENTS, STATISTICS AND METHODOLOGY OF EDUCATIONAL RESEARCH

JOHNSTON, J. B., AND OTHERS. "The 1932 College Sophomore Testing Program," *Educational Record*, XIII (October, 1932), pp. 290-343.

A detailed report of the advisory committee on college testing, containing a detailed analysis of the results of the testing program for May, 1932.

KINNEY, L. B., AND EURICH, A. C. "A Summary of Investigations Comparing Different Types of Tests," *School and Society*, XXXVI (October 22, 1932), pp. 540-544.

The authors present a summary of 33 investigations relating to various types of tests with a discussion of needed research.

SPEARMAN, C. "Pitfalls in the Use of 'Probable Errors,'" *Journal of Educational Psychology*, XXIII (October, 1932), pp. 481-488.

A theoretical discussion of "probable errors" with their bearing upon tetrad-differences and the two-factor theory of intelligence.

MISCELLANEOUS PAPERS

CHARTERS, W. W., AND OTHERS. "Annual Report of the Bureau of Educational Research," *Educational Research Bulletin*, XI (Columbus: College of Education, Ohio State University, October 12, 1932), pp. 309-336.

Contains a report of the activities of the several divisions of the Bureau of Educational Research.

DOLL, EDGAR A. "Annual Report, Department of Research, 1931-32," *The Training School Bulletin*, XXXVI (October, 1932), pp. 113-124.

Contains a statement of the staff, publications, birth injury research, and other information relating to the Vineland Laboratory and Training School.

The Fourth Annual Report, 1931-1932. (Edinburgh, Scotland: Scottish Council for Research in Education, 1932), 18 pp.

Contains a list of offices, the constitution, reports of committees, publications, etc.

GILES, G. R., AND LYALL, JOHN R. *Occupations in Victoria*. Bulletin of the Australian Council for Educational Research (Melbourne, Australia: Melbourne University Press, 1932), 71 pp.

An investigation into the normal annual absorptive capacity of occupations in Victoria, carried out under a grant from the Australian Council for Educational Research. Tables and graphs showing the employment rates for different age levels.

Second Annual Report of the Australian Council for Educational Research, 1931-32. (Melbourne, Australia:

Brown, Prior and Company, Pty., Ltd., 1932), 53 pp.

Contains a report of the executive officer, work carried out by the council, a list of the publications in the educational series, a list of approved investigations, and a bibliography of sources of information concerning education in Australia and New Zealand.

NEW TESTS

BICKFORD, BELLE, AND OTHERS. *Oakland French Test.* Oakland: Bureau of Educational Research, Oakland Public Schools, 1932.

Two forms, A and B, of three parts each: a) comprehension, b) vocabulary, and c) grammar.

HURLEY, IRENE, AND OTHERS. *Oakland Spanish Test.* Oakland: Bureau of Educational Research, Oakland Public Schools, 1932.

Two forms, A and B, of three parts each: a) comprehension, b) vocabulary, and c) grammar.

MALLER, JULIUS B. *Character Sketches: A Test for the Measurement of Personality Adjustment,* New York City: Bureau of Publications, Teachers College, Columbia University, 1932.

The test is composed of 200 items presented in two booklets, Part I and Part II, each of which is composed of six sub-tests: habit patterns, self-control, social adjustment, personal adjustment, mental health, and readiness to confide.

MIMEOGRAPHED BULLETINS RECEIVED

TOOPS, HERBERT A. AND OTHERS. "A Follow-up Investigation of a Study Performance Test at Ohio State University," *Ohio College Association Bulletin,* No. 66.

TOOPS, HERBERT A., AND RIDENOUR, ALICE L. "The Combined Effect of Difficulty and Intelligence on College Scholarship," *Ohio College Association Bulletin,* No. 68.

TOOPS, HERBERT A. "Directions for Administering and Scoring the Ohio State University Revised Intelligence Test Form 17 (Automatic Scoring Edition)," *Ohio College Association Bulletin,* No. 72.

BOWERS, STELLA M. "Personnel Work at Stanford University," *Ohio College Association Bulletin,* No. 73.

NEUBERG, MAURICE J. "A Follow-up of the Findings Reported in O.C.A. Bulletin No. 60," *Ohio College Association Bulletin,* No. 74.

TOOPS, HERBERT A. "1930-31 Report of the Committee on Intelligence Tests for Entrance," *Ohio College Association Bulletin,* No. 75.

MATHIASEN, O. F. "Appearance of the Paper as a Factor Influencing Examination Grades," *Ohio College Association Bulletin,* No. 76.

THOMPSON, LORIN A. "Report on a Note Taking Experiment at Ohio Wesleyan University," *Ohio College Association Bulletin,* No. 77.

TOOPS, HERBERT A. "Norms for Form 17, Ohio State University Psychological Test, based on 32,272 Ohio High School Seniors taking Form 17 in October, 1930," *Ohio College Association Bulletin,* No. 78.

WORKMAN, B. E. "The Work-Limit Method versus the Time-Limit Method

in the Construction and Administration of College Ability Tests," *Ohio College Association Bulletin*, No. 79.

TOOPS, HERBERT A., AND ROYER, ELMER B. "Predicting Soldiers' School Marks: A Problem in Selection of Tests," *Ohio College Association Bulletin*, No. 80.

TOOPS, HERBERT A. "Empirical Psychology and the 'Generalized Regression' Equation," *Ohio College Association Bulletin*, No. 81.

TOOPS, HERBERT A. "1931-32 (Seventh) Annual Report of the Committee on Intelligence Tests for Entrance," *Ohio College Association Bulletin*, No. 82.

HARTSON, L. D. "The Validation of the Rating Scales Used with Candidates for Admission to Oberlin College," *Ohio College Association Bulletin*, No. 83.

ADKINS, DOROTHY C., AND TOOPS, HERBERT A. "On the Systematic Solution of Partial Correlations by Calculating Machine," *Ohio College Association Bulletin*, No. 84.

TOOPS, HERBERT A. "On the Validity of Two Multiplied Traits as Compared with Two Added Traits, Fundamental Equality of the Units of Measurement within the Given Scale of the Several Variables Being Assumed," *Ohio College Association Bulletin*, No. 85.

For copies of these bulletins address: Herbert A. Toops, Ohio State University, Columbus, Ohio.

RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Editor Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.

Iowa Child Welfare Research Station

During 1931-1932 the Iowa Child Welfare Research Station conducted research in the following divisions: (1) nutrition, (2) anthropometry and physical growth, (3) child psychology, (4) childhood education, (5) parent education, (6) character education, and (7) coöperative studies involving other university departments.

(1) For the past ten years the nutrition division has been studying certain phases of the metabolic processes of infants and young children. Considerable data have been accumulated, particularly with regard to the calcium, phosphorus, and nitrogen retentions under various conditions.

(2) Research in physical growth and anthropometry in the main has followed the policy as observed in the last few years, of emphasizing studies which lead to a better knowledge of the physical status of the individual child. The studies of last year have largely been continuations of projects begun one or more years ago. The first stages of the larger studies in this field—that of the determination of the best measurements, of the survey of method, and of the devising of tentative standards (tentative because of the small numbers of cases available for study)—are now practically completed. Further refinements of these methods will be made, and standards based on more comprehensive data will be developed in the near future.

In addition to this research on the evaluation of physical status, a number of projects in relatively pure-science fields have been prosecuted and carried to completion. These studies are part of the mosaic which comprises the study of the physical child. The difference is that pure-science studies build foundations upon which to base further research, while applied studies are laid on foundations already prepared and usually result in findings that are more immediately usable in practical child welfare. As is always the case in research, the completed studies have opened up more problems than they have solved and the need for further work in this field becomes more compelling every year.

(3) The investigations undertaken in child psychology may be classified under the headings: mental development, motor development, infant psychology, aesthetic development, social and personality development, and mental hygiene. For the most part, these researches fall into patterns or programs built around certain emphases or content, although a few investigations are somewhat more isolated in approach.

More investigations have been made on the preschool child than on the other ages, but all ages from birth to adolescence have been studied. Both cross section and sequential measurement methods have been used.

Typical studies in the field of mental development are: "The Determination

of a Reliable Intelligence Quotient for the Young Child," "The Effect of Preschool Attendance on the IQ," "Transfer of Learning in Preschool Children: An Experimental Study of Ability to Solve Different Situations According to the Same Plan," and "Sex Differences in Mental Development."

Studies in the field of motor development are: "Development of Motor Skills in the Preschool Years," "A Study of the Relation Between Ocular Dominance and Handedness in Preschool Children," and "The Relationship Between the Spontaneous Use of Play Apparatus and the Growth in Motor Coördination of Two- and Three-Year-Old Children."

Studies in aesthetic development are: "The Measurement of Musical Development," "A Test of Reproductive Tonal Memory for Preschool Children," and "The Sensitivity of the Preschool Child to Compositional Balance."

Examples of studies in social and personality development are: "An Experimental Study of Social Behavior Stimulated in Young Children by Certain Play Materials," "Studies in the Sense of Humor," "The Companionships of Preschool Children," and "A Study of Aggressive and Submissive Behavior of Preschool Children."

Some of the current problems which are being conducted with newborn infants are: "The Amount of Motility of Seventy-Three Newborn Infants," "The Distribution of the Amount of Motility Between Two Nursing Periods," "The Relation of Motility in Young Infants to Body Temperature," and "The Development and Training of Bladder Control in Infants."

(4) Many of the studies listed under this heading might be classified equally well under "Child Psychology." However, certain studies dealing with such topics as teacher techniques, teacher-child contacts, and the uses the child makes of his environment have been set apart under the above classification.

Researches in this field are coördinated and integrated by the Preschool Education Research Committee. One of the major undertakings of the committee has been the completion of the book, *Educating the Preschool Child*.

(5) Studies being made in parent education are of three types: research in curriculum materials, studies in methods of teaching and learning, and studies of the home environment and family life.

Considerable attention has been directed during the year toward the development of a method of curriculum construction, in which cognizance has been taken of the relation of points of view, duties, traits, fundamental drives, and activities to the conception of the outcomes of education; the relation of the organismic conception to the classification of the outcomes; the efficacy of the variety of methods that have been proposed in the past for the determination of the outcomes; and the recognition of and provision for the fact that our civilization is rapidly changing.

The determination of the learning experiences which will produce given change is the second phase of the construction of a curriculum. This will be given more attention during the coming year as soon as the outcomes of learning have been clarified and instruments for measuring changes, which are now being developed, are available.

During the past year a study was completed in which the factors associated with reading difficulty were studied. A total of over four hundred parents supplied material for this study.

The findings of many of the research studies are immediate contributions to

an improved program for the education of parents. In the study of the home libraries for children, criteria for an appraisal of the books were developed. They furnish useful teaching materials for the topic of children's reading.

(6) Impetus was given to the study of character, and of education as it relates to character, at the State University of Iowa in 1921 when a committee of nineteen Iowa educators, under the chairmanship of Edwin D. Starbuck, was awarded a prize of $20,000 for submitting what was adjudged to be the best plan for character education in the public schools submitted by any state committee in this country. Work in character education was made a part of the curriculum of the university in 1923. An Institute of Character Research was authorized by the state board of education in 1927. Beginning September 1, 1931, the investigation and teaching of character education was continued in the Iowa Child Welfare Research Station as the most appropriate division in the university for the purpose.

Typical studies in character education include "Race Attitudes of Iowa Children," "The Measurement of the Attitudes of Filipino Students Toward America by Use of the Thurstone Technique," and "Personal Attitudes of Delinquent Boys."

(7) The Station has secured the coöperation of other university departments in research projects. Work in art psychology, speech pathology, physiology, and dental hygiene was in progress during the year.

Illinois Bureau of Educational Research

Due to the necessity of institutional economy, the activities of the Bureau of Educational Research were greatly curtailed during the academic year of 1931-1932. Only two bulletins were issued—"High School Science Clubs" by L. A. Astell and C. W. Odell, and "Public Junior College Legislation in the United States" by J. A. Clement and V. T. Smith. Dr. Odell, with the assistance of T. T. Hamilton, made a study of school buildings in Illinois, giving special attention to their unusual features. An experimental investigation to determine the effect of systematic instruction in the reading of arithmetical problems was carried on in the public schools of Decatur. The data obtained from this study were used also in a path coefficient analysis of problem-solving ability. The study of the techniques of educational research reported in Bulletin No. 38 was greatly extended during the year.

The continued necessity for economy has resulted in reducing the staff of the Bureau of Educational Research from eight to three members. The 1932-33 appropriation for printing and other expenses was reduced proportionately. Hence research activities will be greatly curtailed. A study of the demand for teachers in accredited high schools is under way. Mr. Hamilton is engaged in compiling a critically annotated bibliography of summaries of educational research, including those appearing in bulletins and monographs.

Research Division, New York State.—An important characteristic of the research activities in the New York State Education Department is that of coöperation with various teacher organizations of the state and of acting as a clearing house for research studies pertaining to New York State conditions. At the present time some member of the Research Division is working with a research committee of every educational organization in the state. Through bibliographies the

division has summarized the studies pertaining to New York State conditions which have been made during the last ten years. Many of these studies are available only through interlibrary loans. Through another bulletin it has collected a list of problems which are in need of investigation and through this medium has been able to suggest studies to many graduate students.

The College Entrance Inquiry recently completed analyzed the relationship of entrance credentials presented by college students to their subsequent success in the freshman year. Forty colleges coöperated. The most outstanding conclusion is the variability between colleges, probably indicating that college entrance is not and cannot be based on a single standard but rightfully should vary from college to college.

A study is nearly completed, entitled "Preservice and In-service Training of Elementary School Teachers." This investigation was started for the purpose of making suggestions for the modification of the normal school courses of study, but has resulted not only in such recommendations but also in certain definite recommendations with regard to the in-service treatment and training of new teachers.

A number of studies center around problems involved in the small high school. One study is a summary of published and unpublished literature on the small high school curriculum, another points out the relationship between total enrollments and subjects taught, and a third deals with the relationship between subject enrollments and total enrollments. The general conclusion from the last two studies is that a high school needs an enrollment of approximately two hundred pupils before it can offer what is generally considered as a modern program of high school education. An investigation is now being made of the possibilities of consolidation of small high schools.

A study is nearly completed dealing with the history and trend of state school support. This sketches briefly the history from before the Revolutionary War to about 1920 and presents the development between 1920 and 1930 in more detail. The second part of the study analyzes the trends of school costs during the last fifteen years.

A new project has been started which relates indirectly to the large problem of school organization. It is a study to determine the variability of pupils of certain chronological ages. It is planned to do this on a state-wide basis and as a result it is hoped that better information will be available for the forming of classes.

Nebraska Studies.—The State Department of Education in Nebraska during the past year completed an investigation of the status of the rural teacher. Another investigation, by G. W. Rosenlof, deals with the library facilities of teacher-training institutions in the country at large. It represents the second follow-up study after the publication of his Doctor's dissertation on "Library Facilities of Teacher-Training Institutions," which was completed in 1928 and published in 1929. It was expected that this report would appear in the American Library Association Proceedings. An unfinished project deals with North Central Association schools and the adjustments they have been forced to make in their budgets to meet changes in economic conditions. This particular study is just beginning and will be reported at the meeting of the North Central Association in Chicago during March, 1933. Another investigation concerns the state's respon-

sibility for the support of education in Nebraska, a report of which is expected to appear in the coming Biennial Report of the State Superintendent of Public Instruction.

Minnesota Curriculum Work.—The Minnesota State Department of Education with the coöperation and assistance of educators of the state has finished this year a complete, new secondary school curriculum covering Grades VII-XII inclusive. The curriculum is published for distribution in twenty-one subject bulletins. This publication follows an earlier high school curriculum published in 1925, as well as an elementary school curriculum in 1923 which was completely rewritten and issued in revised form in 1928.

The new curriculum is based on the junior-senior plan, but is adapted for use in the grades covered without regard to the type of school organization. The plan followed has been determined in harmony with generally accepted aims for each period as these relate to: (a) placement and treatment of subjects; (b) time allotments; (c) core content and electives including desirable enrichments; (d) procedure in curriculum organization and administration; and (e) the large aspects of methodology.

In the preparation of the 1928 edition of the elementary curriculum, the syllabi for Grades VII and VIII were planned to meet the needs of pupils of junior high school age, and were definitely separated from the work of the earlier six grades. Hence, the new curriculum represents no marked departure such as might disrupt the work of the schools. Moreover, schools are urged in the introductory statement to approach the new plan gradually, and to make no hasty or ill-considered changes from existing plans.

Missouri Surveys.—The State Department of Education recently has completed administrative surveys in 104 of the counties of Missouri. The last General Assembly, 1930-31, passed a new redistricting law for the public schools of the state. The administrative surveys were made for the purpose of collecting data necessary for an efficient and economical redistricting on the basis of certain standards set up by the Department. These survey reports are available through the county superintendents and contain data which will be of value to the redistricting boards of each county. Each report averages about twenty-four pages in length and is divided into four chapters. Chapter I deals with the historical background of public education. Chapter II reviews the present educational conditions in the county. Chapter III reviews the defects in the present school system. Chapter IV gives a proposed reorganization. The reports on the 104 counties will be combined into a single volume and will be available in time for the next Legislature which convenes at the beginning of the year, 1933.

Research in Pittsburgh.—A four-year study of character training has finally culminated in the preparation and publication of three small books under the title of "Guideposts to Character." These books have the subtitles "Loyalty," "Ambition," and "Perseverance" and are allocated for use in Grades VII, VIII, and IX of the junior high school. The material for these books was collected by the teachers of the city and edited by George W. Gerwig, a member of the Board of Education, in coöperation with the Department of Curriculum Study and Research. The study contemplates the preparation of a book for each grade from kindergarten to Grade XII. The

American Book Company is the publisher.

A study of the equated-groups type recently was undertaken in Grade V-B in certain Pittsburgh elementary schools to determine the effectiveness of adding films to such visual aids as slides, photographs, and stereographs in the study of geography. The data for this investigation are now in the hands of the Department of Research and the results of the study were made known about December first. In addition to the objective evidence of test results other pupil responses will be analyzed, and the reactions of teachers to the experimental and control situations will be studied.

Pittsburgh Schools, the publication of the Department of Curriculum Study and Research, in the September-October issue reports a study on "Promotional Practices and Marking in the Pittsburgh Elementary Schools." This report attempts to analyze promotions by grades and the various factors that concern promotion.

Studies of Training School Problems

The Supervisors of Student-Teaching are sponsoring several studies during the current year. There are two of particular importance. The first of these is a preliminary investigation of the status of training-school curriculums in elementary training schools. The work of the investigation is being done by I. D. Payne, Director of Training, State Teachers College, Tempe, Arizona. The project assumes that further studies will be made until the whole field has been investigated. Professor Payne has made considerable progress on the preliminary study.

The second project is the collection and publication of material on actual supervision of student-teaching. This was authorized by the Supervisors of Student-Teaching last year. The study contemplates the gathering of descriptions of supervision of student-teaching from a selected group of institutions. The preliminary plans have been prepared and a list of 112 institutions, including all types of teacher-training institutions, has been made from which the descriptions will be requested. All of the members of the Research Committee and of the Field Service Committeemen have coöperated in making the plans and in selecting the institutions included in the list. Several other persons also aided in this preliminary work. About forty men and women have made the choices represented in the final list.

There has been prepared a series of suggestions to guide in the preparation of the description. These have been mailed to the respective institutions with the request that the descriptions be prepared and mailed to the chairman of the Research Committee on or before January 1, 1933.

On behalf of the many workers engaged in the preparation of teachers, and especially those working in laboratory schools, the Research Committee appeals to the various institutions to coöperate in these projects. More detailed information may be secured from A. R. Mead of the University of Florida at Gainesville, Florida.

Conference of Ohio Statisticians.—The Teachers College of the University of Cincinnati was host to the educational section of the Ohio Conference of Statisticians on November 5. The program of eight papers for this annual meeting, arranged around the theme, "Assumptions Involved in Educational Research," will be mimeographed or published in or-

det that they may be available to those not able to attend the conference.

Three papers were read during the morning session: "The Role of Assumptions in Research," by Douglas E. Scates, Director of School Research, Cincinnati Public Schools; "Certain Assumptions Involved in Social Science Statistics," by Paul Horst, Department of Personnel Research, Proctor and Gamble Company, Cincinnati; and "Assumptions Entering Into Experimental Research," by Louis A. Pechstein, University of Cincinnati. James A. Quinn, of the University of Cincinnati, gave a luncheon talk on "Population Research in Cincinnati," in which he discussed the origin and use of the census tracts. The papers presented in the afternoon session were as follows: "Unstated Assumptions Involved in Recent Reported Studies," by Louis E. Raths, Ohio State University; "Assumptions Involved in Achievement Test Construction," by Ralph W. Tyler, Ohio State University; "Assumptions Involved in Personality Measurement," by Gordon Hendrickson, University of Cincinnati; and "The Broader Aspects of Postulation and Research," by William A. Crowley, University of Cincinnati.

The program was arranged by D. E. Scates, vice-president of the Conference in charge of the Educational Section. The president of the entire organization, including a section on Economic Statistics, is R. W. Tyler. R. L. Morton, Ohio University, was elected vice-president of the educational section for the coming year, and the next meeting will be held at Athens, Ohio.

Personnel Research Federation.—On November 17 and 18, 1932, the eleventh annual Autumn Conference of the Personnel Research Federation was held in New York City. The addresses delivered at the various sessions dealt with occupational trends, adjustment through training, personnel policies during business recovery, and recent experiences in public employment services. The address of the Federation is 29 West 39th Street, New York City.

Cumulated Volume of Education Index The first permanent bound cumulation of the *Education Index* covers the period from January, 1929, to June, 1932. This valuable guide to the periodical literature indexes completely the contents of 117 educational journals published in the United States, Canada, and foreign countries, and in addition indexes selectively nineteen other magazines. Classified lists of recent educational books and of miscellaneous materials are published in each issue. The publisher is the H. W. Wilson Company of New York City.

Cubberley's Retirement.—In the September number of this department, page 78, proof was changed in the publisher's office in such a manner as to occasion possible confusion concerning the date of retirement of Dean Cubberley of Stanford. The date of retirement from active service is announced as June 6, 1933.

Experimental Education Series.—Dr. Harriet E. O'Shea, Associate Professor of Education, Purdue University, has assumed the editorship of the Macmillan Experimental Education Series, to succeed the late M. V. O'Shea, nationally and internationally known lecturer, writer and authority on child psychology. To date the following volumes have been published: (1) William A. McCall, *How to Experiment in Education* (1923); (2) Elizabeth Irwin and Louis A. Marks, *Fitting the School to the Child* (1924); (3)

L. L. Thurstone, *The Fundamentals of Statistics* (1925); (4) A. H. Edgerton, *Vocational Guidance and Counseling* (1926); (5) Leta S. Hollingworth, *Special Talents and Defects* (1926); (6) Leta S. Hollingworth, *Gifted Children: Their Nature and Nurture* (1926); (7) James L. Mursell, *Principles of Musical Education* (1927); (8) Ben J. Rohan, *Enriching the Curriculum for Gifted Children* (1931); and (9) C. E. Ragsdale, *Modern Psychologies and Education* (1932).

Professor M. V. O'Shea wrote in the editor's introduction to one of the early volumes of this series: "Professor McCall has written this book primarily for the purpose of presenting the methodology of educational experimentation in a practical form for the use of teachers and students of education who wish to engage in experimentation, or who desire to understand the great amount of experimental literature which is appearing in magazine and book form." This purpose has been well realized throughout the series. Miss O'Shea is to be congratulated upon this opportunity to continue a splendid service to field workers.

The Scots again use the P.S.A. Tests

In November we received a radiogram from the County of Fife in Scotland ordering 3,000 copies of Battery A of the Public School Achievement Tests. This is the second year that Battery A has been used in the schools of Fife.

What a thrill there is in the thought that American tests are being used for the second time in the land that was made famous by Shakespeare, Robert Louis Stevenson, and Barrie.

Fife! Remember the song that poor Lady Macbeth sang in her sleepwalking scene,

"The thane of Fife had a wife---"

and that dark night when Stevenson's hero, David Balfour, crossed as a fugitive with Alan Breck Stewart over the Firth of Forth from Dunfermline to Edinburgh; and Barrie's Little Minister, Gavin Dysart, struggled with the weavers of Thrums and with his love for Lady Babbie! Fife! That threshold of the Scottish Highlands, famous forever in ballad and romance; hardly a name there that does not recall some stirring memory---the 3000 copies of Battery A of the Public School Achievement Tests are ordered sent to Gregor MacGregor of Kirkaldy! To those who care naught for the past we can say that one of the men responsible for the order wrote to us from St. Andrews on the east coast of Fife on the North Sea and in St. Andrews one finds one of the famous golf courses of the world.

As for depression, Fife has been suffering from depression and worse ever since the time of Macduff---and yet, here we find the shrewd and thrifty Scots of that shire ordering the Public School Achievement Tests for a second time! There must be a reason. Consider these tests for your mid-year testing. Get acquainted with them. You'll find the reason.

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